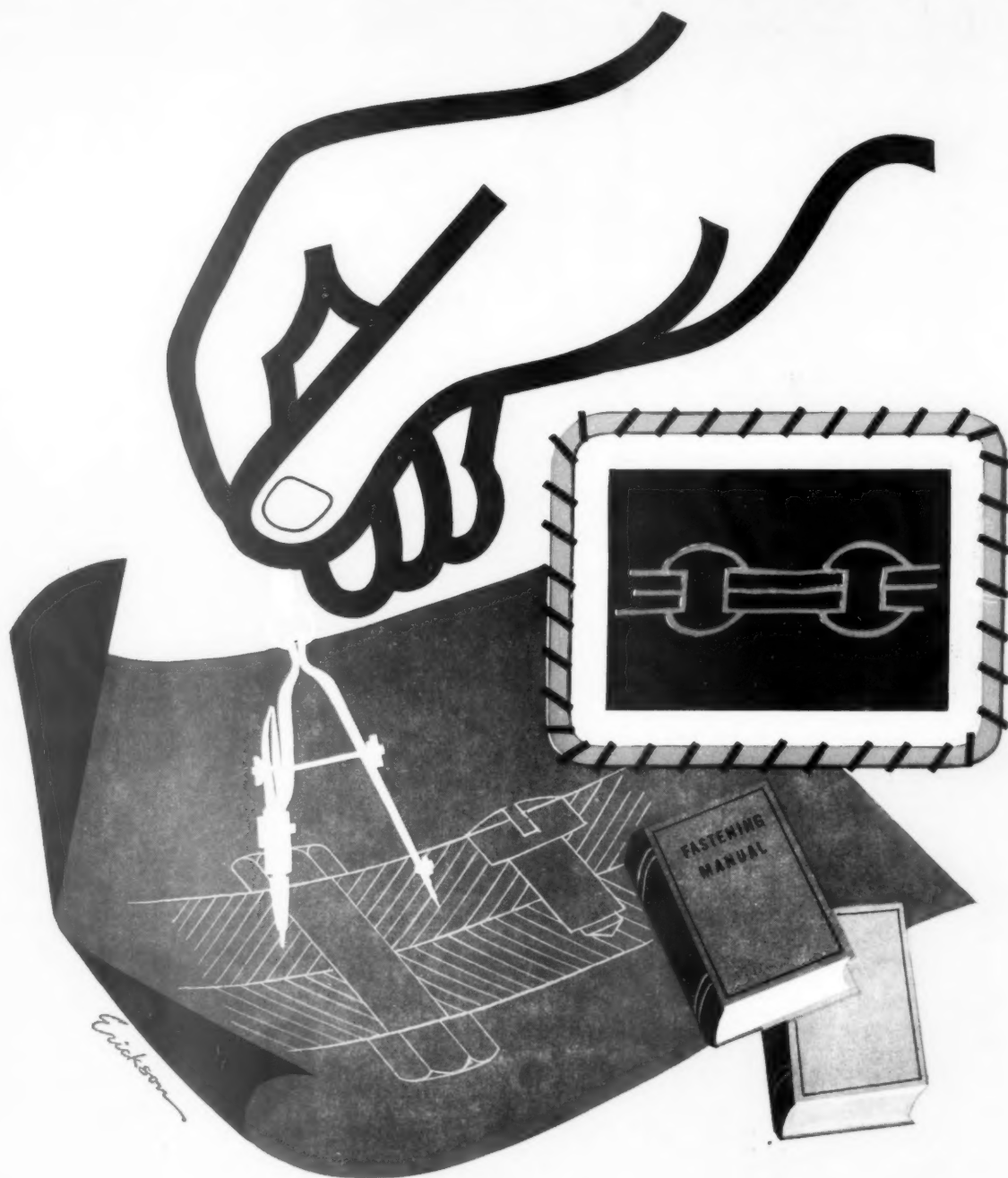


A HITCHCOCK PUBLICATION

assembly & fastener

ENGINEERING



OCTOBER • 1959

In this issue: **The Douglas Fastener School
Bonding Honeycomb Desk Tops at All-Steel
New Assembly Method for Rambler Rocker Arms**

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the Pheoll -team way!

You won't find it spelled out on any spec sheet, but "Applied Teamwork" is a very real, vital part of Pheoll product development. It defines the close, communicative partnership of Pheoll specialists working individually—and collectively—toward the solution of specific fastener problems.

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8. John Trandel, Foreman Cold Heading Dept. (43 years)

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assembly & fastener ENGINEERING

October, 1959

Volume 2, Number 1

FEATURES

- | | |
|--|-----------|
| Why Industry Goes Suburban | 11 |
| Economist Raymond Vernon considers taxes, wages, land values, and transportation costs. | |
| New Assembly Method for Rambler Rocker Arms | 32 |
| Switch to assembly machines, plus change in design of adjustment screws produces better valve rocker arms. | |
| Automatic Nut and Stud Welding | 37 |
| Only one man is needed to operate three automated welders which fasten nuts and studs to base plates of Whirlpool automatic washers. | |
| Bonding Honeycomb Desk Tops | 40 |
| With paper honeycomb, All-Metal cuts desk weight one-third while making desk tops much stronger. | |
| The Douglas Fastener School | 44 |
| Employee-students are schooled in a variety of subjects ranging from blueprint interpretation to making mirror-finish holes. | |
| The Most Popular Articles in Volume 1 | 48 |
| A commentary on the best-liked articles in our first 12 issues, as based on readership surveys. | |
| The Use of Snap-Torque Wrenches | 51 |
| Presenting applications of both factory pre-set and adjustable torque wrenches. | |
| Complete Index of Articles Run in Past Year | 96 |

DEPARTMENTS

- | | |
|------------|---------------------------------------|
| 2 | Letters to the Editor |
| 9 | The Editor's View |
| 12 | Business Notes |
| 15 | Industry at Work |
| 19 | Assembly & Fastening Ideas |
| 25 | Reports from the Field |
| 55 | What's New in Equipment |
| 63 | What's New in Fastening |
| 73 | Useful Literature |
| 83 | Industry Makes News |
| 95 | Product Index |
| 104 | One Last Word |

• Before a Douglas employee is permitted to work on their assembly line, he must attend the company's fastener school, and must pass either oral or written examinations before getting a work assignment. For the story of this school, turn to page 44.



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Letters to the Editor

Silent Non-Sticking Hinge

In your April "reports from the field" you showed a silent non-sticking all-nylon hinge developed by American Plastics Corporation. Our engineering department is definitely interested in this item . . . and would appreciate your advising us the address of this firm.

J. V. Harp
Asst. Purchasing Agent
The F. C. Russell Company
Columbiana, Ohio

Weld Fasteners

I would like to obtain reprints of your articles on "The Design and Application of Weld Fasteners" which were published in your July and August issues.

W. F. Brown
Technical Engineer
Aircraft Nuclear
Propulsion Department
General Electric Company
Cincinnati, Ohio

No Compromise on Quality

In your August issue there was an editorial entitled "Don't Compromise with Quality Control." Would you please forward us a dozen copies.

G. V. Gecan
Manager of Inspection
The Maytag Company
Newton, Iowa

Only 85 Percent—Not 600 Percent

In your July issue on page 16 you show the remarkable achievement of the reduction of coil binding time by 600 percent. Perhaps one of your editorialists should do a little arithmetic before writing headlines . . . It seems to me that a job can only be reduced by a maximum of 100 percent. This would eliminate the job altogether. Any more than that is highly theoretical.

If the job is in reality reduced from 35 minutes to 5 minutes, the reduction in time is 30/35ths or 6/7ths. If we must carry this out to percentage we find that it is an 85.71 percent reduction in clamping time.

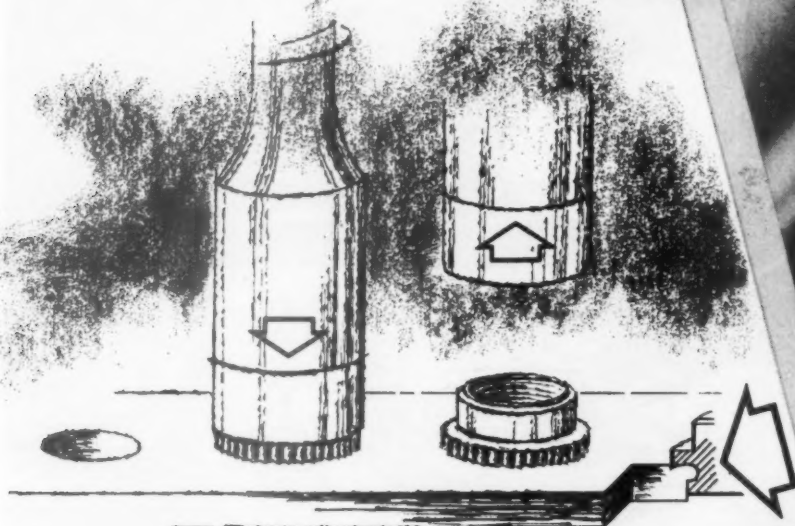
In this day of technology, it is a shame that we don't have a few people who can do some basic arithmetic.

Arthur S. Tisch
Director, Technical Sales
Independent Nail & Packing Co.
Bridgewater, Massachusetts

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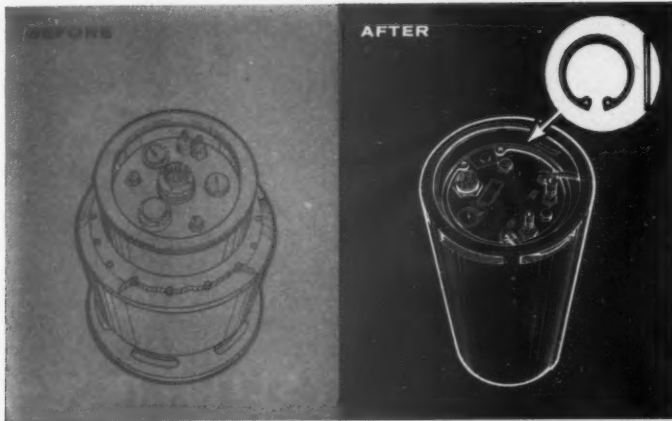
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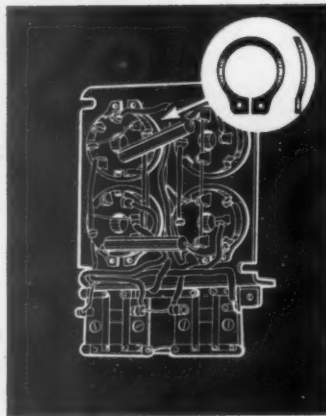
Assembly and Fastener Engineering



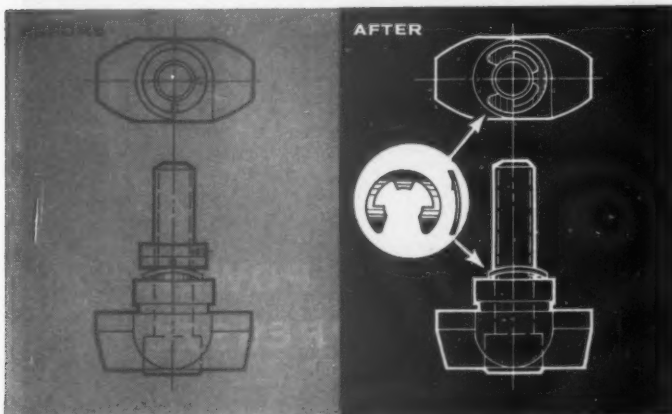
Pressure cover design simplified. Two axially assembled Truarc Series 5002 beveled rings eliminate 27 bolts, reduce machining and assembly time from 78 to 1½ hours and make possible drastic size and weight reductions. Rings retain two covers of a pressurized x-ray unit. Savings: about \$500 per unit.



Parts eliminated in slide assembly. Two radially assembled Truarc Series 5139 Prong-Lock® Rings provide proper spring tension, eliminate looseness and wobble in this office calculator shift-slide. Original design called for a cut washer, spring washer, and cotter pin—all eliminated.



New way to install electron-tube sockets. Easy-to-apply Truarc Series 5101 bowed external rings lock tube sockets to chassis plate in this assembly. Bowed construction takes up tolerances of molded grooves, thickness of base. Individual sockets are removable for field service.



Quarter-turn clamp improved. A bowed washer and two locknuts were eliminated in this quarter-turn jig-and-fixture clamp by a Truarc Series 5131 bowed E-ring. The radially assembled ring holds the screw captive, provides required rotational drag between parts with sufficient tension to insure tight fit when the screw is first engaged. Typical savings: \$1.35/unit—assembly up 70%.

Truarc rings for end-play take-up offer significant design advantages

A number of Truarc retaining rings are available to take up end-play or loose fit caused by accumulated tolerances and wear. The rings often eliminate spring washers, collars and set screws, nuts, bolts, rivets, cotter pins and other conventional fastening devices with outstanding cost savings in machining and assembly time.

Truarc retaining rings designed to deal with the end-play problem are of two general types: bowed rings for resilient end-play take-up and beveled rings for rigid end-play take-up.

Bowed retaining rings are widely used for pre-loading bearings, preventing vibration or oscillation in linkages, providing tension on adjusting screws. Of particular interest is the radially installed Truarc Prong-Lock® ring which locks securely to the shaft by means of two prongs. It provides exceptional thrust load capacity, may be used as a shoulder against rotating parts, and often eliminates springs, bowed washers and other tensioning devices.

In beveled rings for rigid end-play take-up, the groove-engaging edge is beveled at 15°. There is a corresponding bevel on the load-bearing groove wall. To take up end-play, the ring acts as a wedge between the outer groove wall and the part being retained.

These are just a few of the 50 functionally different types of Truarc retaining rings. They come in up to 97 standard sizes, six metal specifications, 13 different finishes. The entire line as well as accessory assembly tools, grooving tools, and over 70 typical applications are shown in the new catalog RR 10-58. Write for your copy today. And remember Waldes Truarc engineers are always ready to work with you on your specific projects. Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y.

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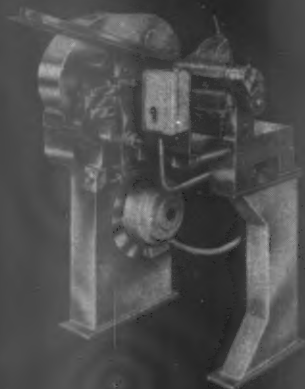
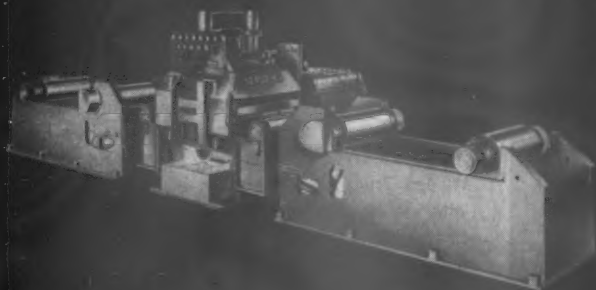
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COL. A.E.R. PETERKA, *Manager of Aircraft Sales, Lamson & Sessions, tells why...*

"Flying fasteners" keep our sights high

AT Lamson & Sessions, we're producing many types of special "astronautics fasteners"—for use in aircraft, engines, missiles, space satellites. This fact has important meaning to you, as a fastener buyer, whether or not you use these high-precision specialties. Here's why:

Engineering, inspection procedures, precision equipment at Lamson are geared to meet strict military and aircraft specifications, where required. Since we're set up this way, many of the same procedures and quality controls are applied to our production of commercial fasteners. This means you can expect, and get, superior quality and precision from Lamson.

New quality standards are being set in astronautics fasteners...to meet the grueling demands of supersonic speeds, severe "blast-off" stresses, higher operating temperatures. Just as automotive requirements raised Lamson's quality levels far above the wagon-buggy-and-plow days of 40 or more years ago—so have astronautics imposed a new set of standards. These permeate everything we do. And *all* our customers benefit!

Take advantage of the specialized engineering know-how and high quality standards available through Lamson...wherever you need fasteners for critical assemblies.

L & S Fastener Engineering helps you "tighten up" on...

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THE EDITOR'S VIEW

OCTOBER, 1959, VOL. 2, NO. 1

FROM "NUTS AND BOLTS" TO "FASTENERS"



Seems like it was only a few weeks ago that we appeared on the scene to provide you, in the engineering fraternity, with "an opportunity to soar your imagination and to exercise your creative gifts" in the area of assembling and fastening. But 52 weeks have passed, according to the twelve bound copies on my bookshelf.

Though it is difficult for us to evaluate our efforts as far as our avowed goal is concerned, we do know that we have struck a responsive chord with you who have specialized responsibility in those areas of manufacturing concerned with assembly and fastening. And elsewhere in this issue you will find an evaluation of your response to our efforts thus far.

We do have a modest accomplishment to mention here. It is concerned with my "alma mater" of industry—the International Harvester Tractor Works. Fifteen years ago in August my industrial career was begun on the Farmall assembly line. I worked six weeks there to get a taste of production

work before taking up my editorial duties with the company.

We used a lot of big nuts and bolts on that line. But times have changed. A friend at Tractor Works tells me that since ASSEMBLY & FASTENER ENGINEERING came on the scene, they no longer call them "nuts and bolts." They are now called "fasteners."

It has been gratifying to know that you readers consider us more than just an assembly and fastening magazine. Your letters as well as your brief comments on inquiry cards indicate that we are accomplishing what we set out to be a year ago, namely "a meeting place of new conceptions, and a clearing house of advanced thinking" in assembly and fastening.

And now we enter our second year, not much older, but certainly a little wiser as to the specific needs of industry. Your many suggestions help pin-point these needs. So keep forwarding your ideas, and we'll carry the ball from there.

Dr. E. H. Hensley

Managing Editor

Captive Quick-Opening Fasteners:

Southco standards provide many benefits at low cost for access through doors, covers, panels and into drawers

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	<p>ADJUSTABLE PAWL FASTENER</p> <p>Has twin-knob control. One knob controls pawl, pointer shows pawl position. Other knob controls amount of pressure to seal closure with uniform pre-set compression. Easily installed.</p>		
	<p>ADJUSTABLE PAWL FASTENER</p> <p>Compact and rugged. Eliminates rivets or bolts to save installation time. Three types cover grip range up to 3/4". Supplied either with integral metal and plastic knob, plastic knob or for your knob.</p>		
	<p>ARROWHEAD DOOR LATCH</p> <p>Requires only one hole to install. Operates on quarter turn. Holds under spring tension. Arrow shows pawl position; no pawl stops required. Uses minimum inside space.</p>		

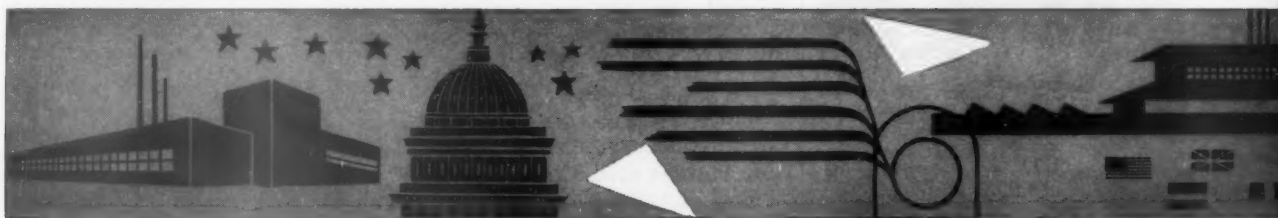
Free Fastener Handbook

Send for your complete Southco Fastener Handbook, just printed. Write to Southco Division, South Chester Corporation, 257 Industrial Highway, Lester, Pa.



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The State of Business



WHY INDUSTRY GOES SUBURBAN

by Dr. Raymond Vernon

There are 184 recognized metropolitan areas in the United States today—areas which contain a core “central” city surrounded by suburbs. While our study was aimed at Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis and San Francisco, it applies to all central cities.

These 13 cities alone provide 19% of non-farm production. 23% of non-agricultural employment.

Let's consider their business costs.

1) City wages tend to be indistinguishable from the suburbs due to high job mobility.

2) Space costs? Land values in cities are astronomical. Costs of buying and clearing land, the time taken in acquiring separate parcels and the restraints imposed by the shapes of city blocks combine to virtually bar private redevelopment.



DR. RAYMOND VERNON

Director, New York
Metropolitan Region Study

Economist Vernon directed a 40-man staff in this two-year, \$600,000 study. Following 20 years of government service, he recently assumed a professorship at Harvard University.

But the cities suffer no disadvantage in rental or office space. City manufacturing rates are scarcely higher than in the suburbs. Likewise for office space, though this usually is an academic question. Where it is an issue, large non-productive areas (cafeterias, banks, etc.) in suburban office buildings make savings related to space cost quite conjectural.

3) The pattern of transportation costs is complex. In general, the longer in time and distance a trip in “commercial” zones, the higher the rates. Presumably, local goods would tend to be distributed from the center of the area. However, from here, deliveries

must work their way through high-congestion, even to serve areas of low congestion. This accounts for the rings of warehouses and terminals found at city edges.

Intercity rates have centralized manufacturing. Lower “commodity” rates usually apply to districts being coterminous with central city shippers.

4) Taxes are higher in cities.

Why then the concentration of jobs in cities?

As one studies the array of industries in central cities, a score of major ones stand out as possessing common traits. Each is dominated by comparatively small plants. Each is associated with the need for speedy communication and transportation. Each is characterized by highly variable output both in form and volume.

These industries (e.g. printing, metalworking, apparels) dealing with “unstandardized” products find the need for holding in bounds the cost generated by their uncertain outlook. Clustering is logical when faced with requirements for sub-contracting, varying manpower, prompt supply and delivery and face-to-face contact with customers.

In sum, small plants are being pulled toward the city by their dependence upon its services while large plants are being pushed away in order to effect economies of scale.

Stimulated by the automobile and rising incomes, population too has moved outward. Obsolescence, decay and slums have filled in behind.

Cities were once market towns. As recent as 1929, ninety-three percent of wholesaling was concentrated in 13 metropolitan areas. Today, trucking has freed the wholesaler from the need to be on a rail line or waterway.

Goods-handling has also been revolutionized. Fork-lift trucks, drag lines, the palletizing of goods have created a demand for horizontal warehouses, limited in central cities.

Cities are becoming more reliant upon office activity. Headquarters are drawn downtown to be close to trade currents and the large, literate labor pool. But as commuting distances lengthen and data-processing systems increase, employment also will be affected.

continued



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State of Business, continued

We may be entering a new phase in the development of the large central cities. At the very center of such cities there will be continued vitality. Offices will increase.

This aside, one sees only growing obsolescence in the central city beyond its business district.

When middle-income structures reach advanced obsolescence, they will be converted to intensive low-income use. The ancient slums will be partially abandoned for the newer ones; a wave moving gradually outward to the city edges and into older suburbs.

Jobs and retail trade will move out with the people. Manufacturers and wholesalers will continue to respond to obsolescence by looking for new quarters in the suburbs.

Beyond the business district, therefore, but within the central city, there will be a long-run decline in the intensive use of space as sites for jobs and homes. Will such space be turned to other uses?

It is difficult to detect any actual or incipient private demand for city space which is great enough to replace such prior uses.

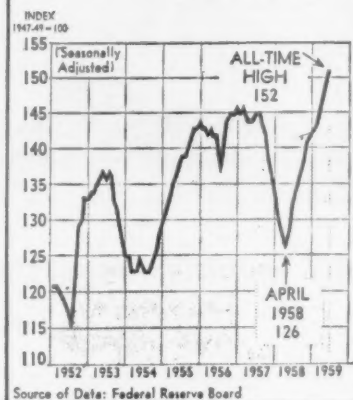
Modern factory space is ruled out by the high costs of recapturing the site; new multi-story lofts face a poor market since they will be competing with obsolescent factories vacated by their prior owners; office space can be expected only to fill a concentrated area toward the city center.

This leaves two possibilities: that middle-income families may decide to return to the cities in large numbers; or that subsidized governmental intervention, such as low-income housing or open-space projects, may be expanded.

The first possibility would fly in the face of deep-seated historical trends, based on powerful sociological forces. The latter demands a scale of intervention much larger than any which has been contemplated.

The author's full report on this subject is available in the 79-page *The Changing Economic Function of The Central City*, \$1. CED, 711 Fifth Ave., New York 22, N.Y.

TOTAL INDUSTRIAL PRODUCTION OF THE UNITED STATES



Industry Briefs

Machine tool builders were tided over the steel strike-caused lull by \$5 million in foreign orders, equaling the total from overseas buyers for six previous months... Ford and Chrysler compact cars started through assembly lines in mid-to-late September, while GM had 13,000 Corvairs in its lots by Labor Day... So far over 4.2 million cars have been produced this year, up 50%. Chevy's 1.2 million output leads Ford by 40,000... Growing demand during Khrushchev's visit for reappraisal of trade with the Soviet blow will likely stall at the big hurdle: politics. Goods being sold to Western allies are being passed on to Russia, goes the complaint... New Secretary of Commerce Mueller reportedly favors equalizing manufacturing excise taxes with a national sales tax... Airline traffic will rack up a 15% advance in '59, but the jets may soon burden the lines with over-capacity. Will there then be fare reductions?... Consumer installment credit's monthly rise in July was the largest since September 1955... The Pentagon expects to salvage \$72 million by cancelling the balance of the Navy's order with Martin for Seamaster planes. Already spent for nine planes: \$472 million... GM is granting Sloan-Kettering Institute \$50,000 to determine if there is any relationship between auto exhaust gases and cancer.



Assembly costs cut 50% at design stage by Tinnerman **SPEED NUT®** Brand Fasteners!

Fastener ideas worked out between designers at Hillside Metal Products, Inc., and Tinnerman engineers, resulted in the selection of 3 different SPEED NUT types for Hillside's complete line of quality steel office furniture. Hillside estimates "at least a 50% saving in material costs, assembly time and tooling" over ordinary fastening methods. And spring-steel SPEED NUTS hold tight, even through years of hard service.

A special Dart-Type SPEED CLIP® snaps into a punched hole, securely anchors one end of the drawer latching mechanism spring. A standard Push-On SPEED NUT "bites" into a stud; prevents the other spring end plus latching bar from backing off. Desk tops as well as desk and table legs, are attached with the help of SPEED GRIP® Nut Retainers that snap into bolt-receiving position in punched holes. A Push-On completes the file drawer follow block assembly; two more secure each filing cabinet drawer card holder.

This should give you an idea of what a free Fastening Analysis can probably do for you in savings and improvements on present or new products. Look up your Tinnerman representative in the Yellow Pages under "Fasteners". Or write to

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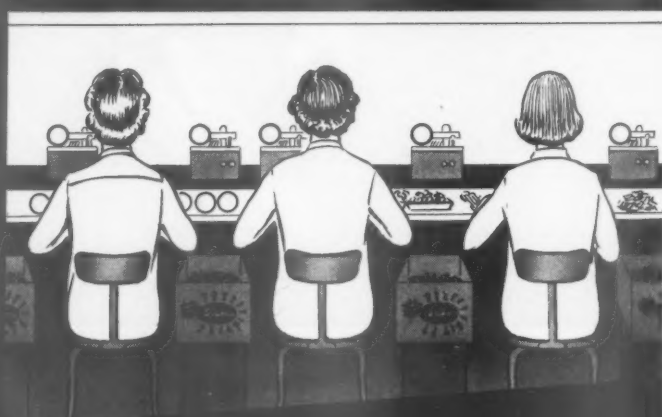
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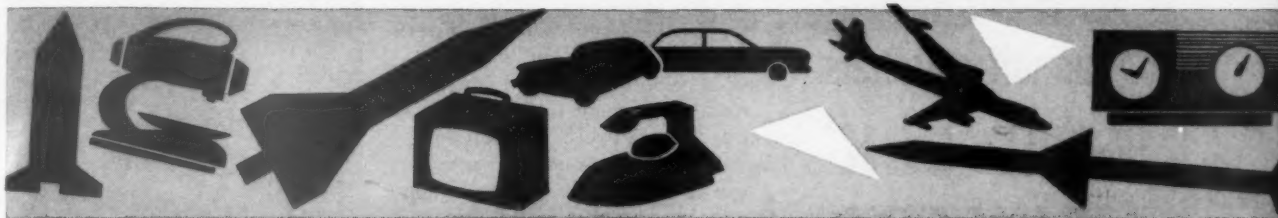
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Assembly and Fastener Engineering

Industry at Work



COLD EXTRUDING CUTS STEEL SCRAP LOSS IN PRODUCING CAR LATCH ROTORS

Scrap loss in the production of steel rotors for automotive door latches has been practically eliminated by the use of cold extrusion dies at the M&S Manufacturing Company, Hudson, Mich.

The rotor, a fairly complex shape, has been produced in at least four entirely different ways. These methods include machining from a special cold drawn rotor section, an operation that is still in use but which required considerable machining and a waste of 65% of the section in steel chips. An extruded shape was tried also but was not ideal because of an integral spindle on the rotor.

The cold extrusion die process forms the rotor in two hits on a round slug of steel. The rotors, 1½" in diameter, are produced at the rate of 50 a minute on one press. The slugs are cut off ¾" round SAE 1010 cold drawn bar stock supplied by Jones & Laughlin Steel Corporation. Steel is aluminum killed to a fine grain structure and annealed to a maximum of 65 Rockwell B hardness.

Cold extrusion improves physical properties of the C-1010 material. However, after the parts are deburred, washed and broached to produce parallel flats on opposite sides of the spindle, these properties are further improved by surface hardening to a depth of .002 to .005 in a cyanide bath.

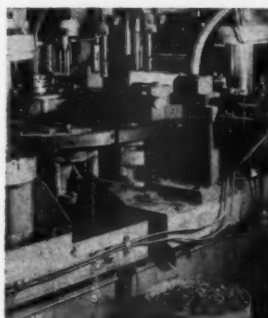
The extrusion process is done with a 500-ton Vernon press—a double-crank, single-action type. The extrusion process is facilitated by a special phosphate coating that is put on the blanks for lubrication in the dies.

Two parts are made simultaneously in eight rotating dies. The slugs, which have been cut to approximately 1½" lengths by automatic screw machines, are reduced very slightly in length. The metal in the ⅜" wide rotor teeth is squeezed out by a reduction in diameter of the integral spindle.

The only loss of material now is in cutting the blanks, deburring and cutting flats on the spindle. This amounts to a fraction of one per cent. M&S has a production potential of 1,000,000 rotors a month.

The ductility of the steel plays an important role because it permits continuous production without cracks or splits from the tensional

continued



Steel rotors are completed by a two-hit cold extrusion die process at a rate of 50 per minute.



Slugs have been cut from bar stock and will be extruded on a 500-ton press.



Cold finished bars to be made into rotor door latches are fed into an automatic screw machine at the M&S Mfg. Co. where they are cut into slugs.

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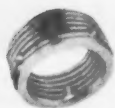
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Industry at Work, continued

stresses that are applied in the dies. There are no rejects, according to D. A. Lillywhite, M&S vice

president, who points out that rotors are produced within a tolerance of .003".

LOCKHEED TESTS SIMULATE SPACE FLIGHTS TO MARS, VENUS

Space scientists have made what are believed to be the first simulated trips through the atmospheres of Venus and Mars.

And, they report, the aerodynamic heating problem created going through the Venutian atmosphere is about 50% greater than would be experienced in hypersonic flight through the earth's blanket of air.

Results of tests made at Lockheed Missiles and Space Division's Scientific Research Laboratory in Palo Alto reveal that increased heating results from the fact that the atmosphere of Venus is mostly carbon dioxide and, therefore, heavier than the atmospheres of earth and Mars. Friction is greater and heating rises commensurately.

The Lockheed scientists conducted their experiments in a 40-foot-long shock tube. The atmosphere of the particular planet being studied is simulated by filling the main barrel of the three-inch tube with the elements believed to compose the atmosphere.

A blunt nose shape, representing the space vehicle, is placed at one end of the tunnel, while the ingredients for the generation of a shock wave (hydrogen, oxygen and helium) are confined by a copper diaphragm in a combustion chamber at the other end.



Blunt nose cone to be used in experiment to study the problem of entry into the atmosphere of Venus is carefully inserted into end of 40-foot-long shock tube by scientists K. K. Chan and R. W. Rutowski at Lockheed Missiles.

The pressure in the chamber is built up to several thousand pounds by igniting the mixture by a series of spark plugs. The resulting explosion rips through the copper disc and the shock wave blasts the length of the tunnel striking the test model, which has a tiny heat gauge mounted on its nose. The entire experiment takes only one ten-thousandth of a second.

Using this technique, shock wave velocities of 14,000 miles an hour have been attained.

SEA WATER DISTILLATION PLANT ALSO GENERATES POWER

The world's largest installation to supply fresh water from the sea was recently engineered by Singmaster & Breyer of New York and completed at a cost of \$10,600,000. Located on the island of Aruba in the Netherlands West Indies, the plant is the first to generate inexpensive electricity at the same time it supplies 2,700,000 gallons per day of fresh water.

Aruba, off the coast of Venezuela, is the site of a large oil refinery, and has a population of 55,000 persons. Rainfall, however, is so slight that it cannot provide even a secondary source of water.

Aruba has no fuel of its own, and so the government must buy

the fuel oil needed for distillation from the local refinery at the going commercial price. As the cost of fuel is the largest single factor in the cost of distilled water, a highly efficient installation was essential.

Aruba also needed more electric power. Costs were rising and capacity was inadequate at the existing power plant, which has diesel-driven generators. A steam-electric plant which would exhaust its steam to the water distillation plant was installed. In effect, electricity is produced as a by-product of the water plant at a cost of less than 3 mills per kilowatt hour. •



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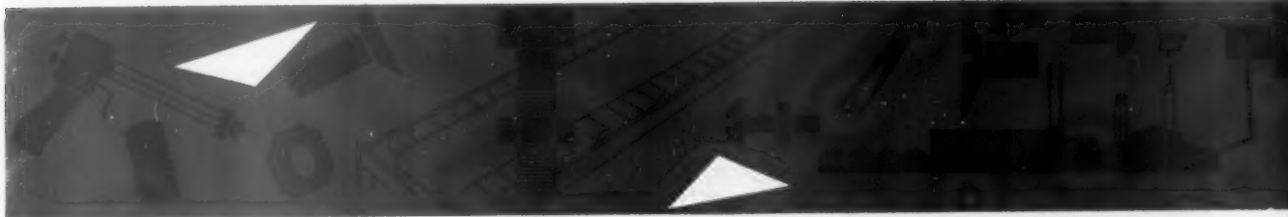
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Assembly and Fastener Engineering

Assembly and Fastening Ideas



High-speed Sonoweld process utilizes low power equipment, with a line power demand of less than four kilowatts in seam welding light aluminum sheet in excess of 30 feet per minute.

SLIDING TRAYS AID PISTON ROD ASSEMBLY

A change of method and the introduction of some simple jigs has achieved a 40% increase in the output of piston rod assemblies for shock absorbers at the Ossett, Yorkshire, factory of Woodhead-Monroe Ltd., England.

The old method employed a turntable on which were all the components and assemblies in different stages of completion. The girls—seated around the turntable—picked up the components, assembled them, and replaced them when completed, on the turntable. When more components were required a girl had to leave her position and get them, causing a break in the sequence.

Now, girls sit at each side of a bench and facing them, in racks, are boxes containing the compo-

continued

ULTRASONICS SPEED LIGHT SEAM WELDING

Another advancement has made it possible to use ultrasonics for seam welding light gauge sheet and foil in thicknesses ranging from 0.006" to 0.010" at speeds above 30 feet per minute. Speeds greater than 100 fpm have been repeatedly demonstrated in somewhat thinner materials.

Four months ago Aluminum Co. of America and Aeroprojects Inc., jointly announced the development of ultrasonic splicing of aluminum foil with the use of Sonoweld machines.

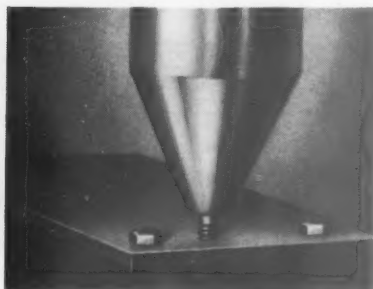
Unlike induction or resistance welding processes that involve melting, ultrasonic seam welds can be stopped and started abruptly, without producing long "start up" seam sections of inferior quality. The new joining method establishes leak tight weld seams, even by helium leak standards.

The ultrasonic welding process is characterized by relatively non-critical strip cleaning. Degreasing is all that is required for most aluminum alloys.



Caster-mounted sliding trays free both hands for the assembly of piston rods. New assembly methods have upped output 40% at this plant.

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Assembly and Fastening Ideas, continued

nents; one girl keeps these boxes full. At one side of the bench one girl builds complete piston assemblies in special trays holding 200 units at a time. These are passed to the opposite side where two girls slip the piston rods into holding trays in batches of 50, and fit the piston assemblies to the rods before passing them on to the last position where the nuts are pneumatically tightened.

The trays are made of a soft metal which obviates the risk of damage to the rods, and at each corner of the tray a ball-bearing type of caster is fitted to allow them to be slid along the bench.

These caster-mounted sliding trays free both hands for assembly, instead of holding the rod with one hand.

The tubular metal bench was specially designed with guideways at two levels for carrying the trays. The higher one holds the piston rod assembly trays while on the lower level the rod-holding trays are accommodated during assembly and later passed on for the final operation.

Improvements in assembly method has reduced the number of female operatives needed to run the section from six to five.

HOW TO ADAPT A STANDARD DRILL FOR DRIVING FASTENERS

Manufacturers are finding it practical to drive screws and nuts on assembly jobs using standard $\frac{1}{4}$ " portable drills. All that is



needed is a speed reducer which provides an increase in torque.

Supreme Products Corp., Chi-

cago, has developed a speed reducer kit with two square drive adapters and several sizes of screw driver bits. The reducer increases torque seven-fold. The operator controls the action with his finger tips which hold the housing of the tool. He can stop action instantly by releasing his grip, enabling the fastener to be "walked" into position. The manufacturer considers this to be an advantage over tools that depend on the motor slowing down before action stops.

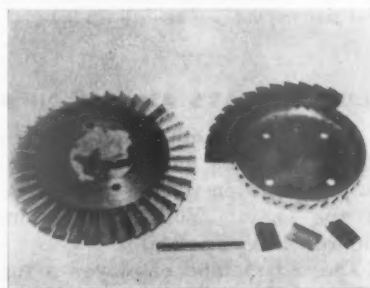
The Versamatic can be made to operate in reverse with a simple adjustment.

ROTOR PROCESSING COSTS CUT 80 PERCENT BY BRAZING

When a stainless turbine rotor assembly was redesigned to use furnace brazing, processing costs, including labor and materials, were cut a startling 80 percent.

The part was originally produced as a machined Type 347 stainless steel forging. Machining from the solid was considered the only process that could meet the critical dimensional requirements of the rotor.

Stainless Processing Division of Wall Colmonoy Corp., Detroit, redesigned the rotor as a brazed assembly of Type 347 stainless steel details. The rotor hub is produced by brazing together a pre-machined stainless ring and disc. The ring is provided with

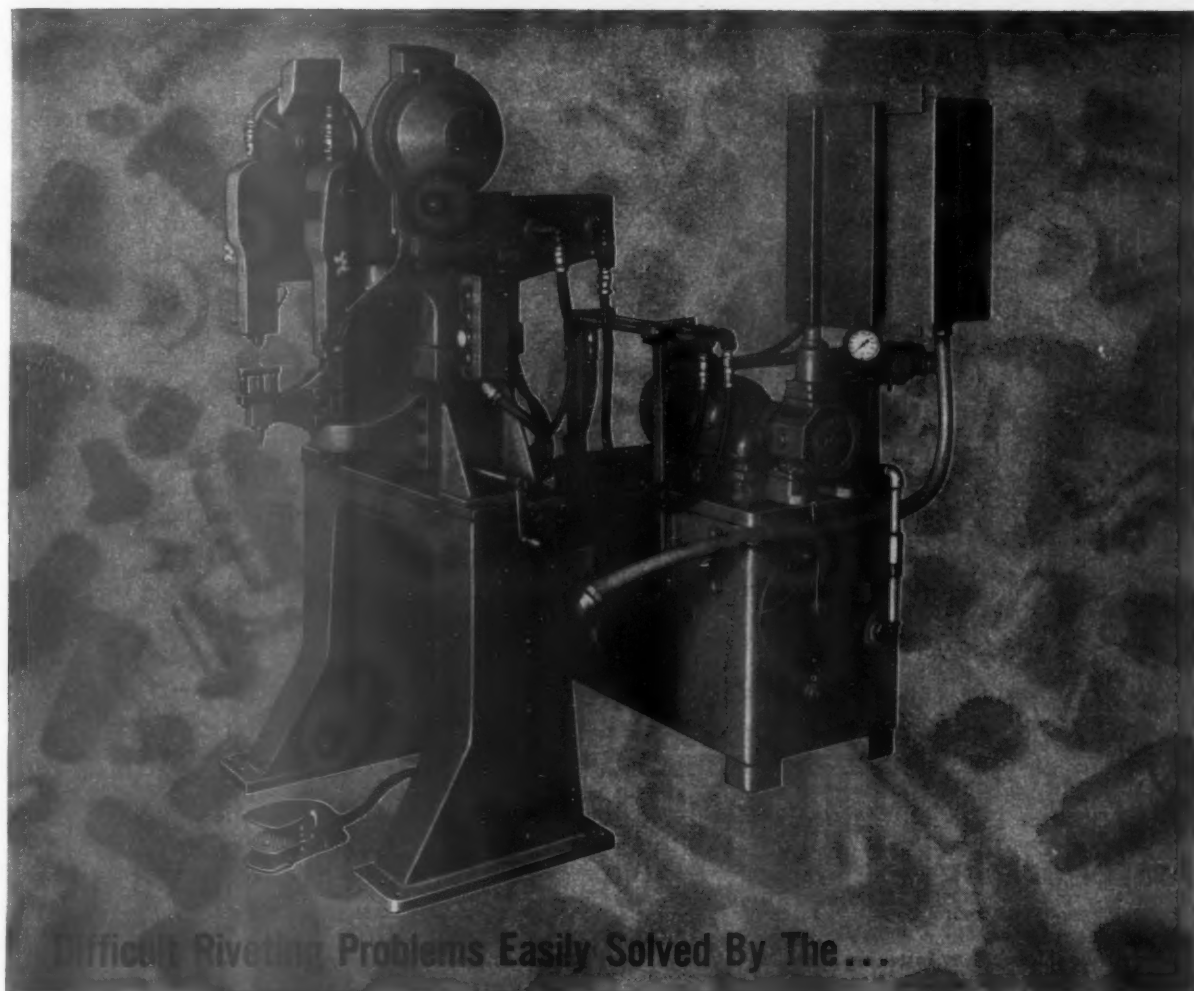


Turbine rotor assembly redesigned for brazing consists of 35 forged blades, ring and disc, all fabricated of Type 347 stainless steel.

airfoil-shaped slots to accept the blade root forgings. The forged blades are finish machined to specifications prior to brazing.

Separate production of the blade segments substantially re-

continued



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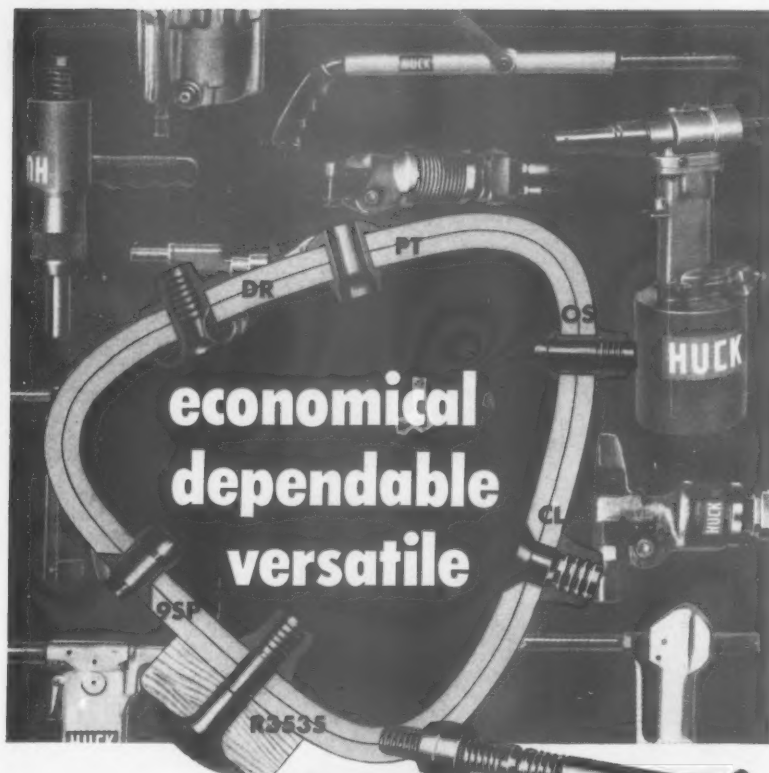
Added recently to the versatile T-J line of unit and production line riveting and clinching machines is the new Hydraulic Dual Rivitor. The Model HDR will set two $\frac{1}{4}$ " solid steel rivets at once with adjustable spacing from $1\frac{1}{2}$ " to 18" maximum, center to center, being fed from 10" hoppers. Operating cycle is approximately .8 second, at 420 P.S.I. oil pressure furnished from a hydraulic power unit with maximum of 1000 P.S.I. output. For complete specifications write to The Tomkins-Johnson Co., 2425 W. Michigan Ave., Jackson, Michigan for Bulletin HDR-4-59.

For information on other T-J Rivitors and Clinchers write for Bulletin No. 555.



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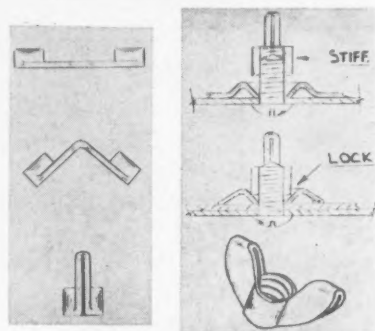
Assembly Ideas, continued

duces scrap costs; improper machining of a blade in the brazed design, for example, means scrapping only the blade forging—in the machined-from-the-solid design, on the other hand, improper blade machining means scrapping the entire rotor forging.

The 38 separate pieces that make up the redesign are simultaneously brazed in a pure dry hydrogen furnace at 2150°F.

The design eliminates the need for elaborate brazing fixtures to properly hold the details together during brazing. A simple machined ring type of fixture is used to support the blades during furnace processing.

BRITISH DEVELOP NEW NUT FABRICATING METHOD



A new method for the manufacture of nuts has been developed by M. F. Robertshaw Ltd., of Bletchley, Bucks.

The principle consists of a thread form introduced into a pressed metal blank which takes the shape of a bisected wing nut: it is then folded, forming a nut which is consequently split into two halves, but tied at the top by the fold—the halving of the thread allows a tension to be exerted on the bolt itself. When tightening the bottom ends of the nut coincide with a cupped recess on the component to be fixed or, alternatively, an individual cupped washer which gives a collet effect, so giving a locking action of the two halves on to the thread.

This principle whereby wing nuts with stiff and lock-nut properties are manufactured can be converted to other applications such as for light bolts, plastic inserts and various other uses. •

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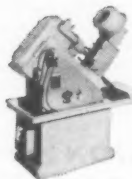
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within .002"

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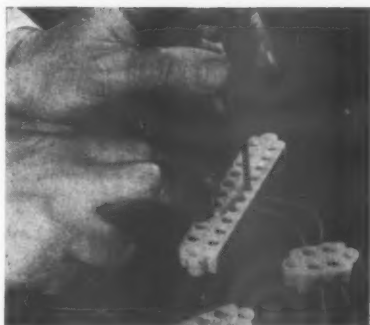
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REPORTS FROM THE FIELD



Die cast cams less than $11/32$ " in height and $1/4$ " in diameter are the heart of a new principle for connecting electrical terminal boards.



Detail drawings show: (left) wedge-locking action of cams; (X) position of wire end just before clockwise rotation of cam locks wire in place; (Y) section through the cam showing how several wires are compressed for good electrical contact and high mechanical strength.

TERMINAL BOARDS CONNECTED BY TINY DIE CAST CAMS

Two years ago, inventor Ben Doktor devised the Camblock connector fastening principle for an electrical terminal board. But when Willor Mfg. Co. sought to produce the new connector it found that the V-groove cam that was the heart of the device became a production bottleneck.

Willor turned to Gries Reproducer Corp., New Rochelle, N.Y., which makes tiny parts by automatic die casting.

The cam functions ingeniously. As it is turned on its pivot, the groove forms a triangular opening with the metal cell wall, which is almost tangent to the cam. This V-groove is the developed surface of the cam; it varies in width, depth, and angle of V along its length.

One or more bare wire ends can be inserted between the cam body and the metal cell wall, and as the cam is turned toward the wire (clockwise), the advancing cam surface meets the wire surface and eventually wedges all the wires against the cell wall. Yet, all the wires can

be connected or disconnected in a split second by backing off the cam or turning it in a counter-clockwise direction.

During the development phase, when cams had to be made in small numbers, parts were machined. The peculiar shape of the V-groove put screw machining at a decisive disadvantage, since only surfaces of revolution can be accurately produced by turning methods. Also, tool marks and burrs could not be satisfactorily tumbled off, so that there was always the possibility of "chewing" off wire.

None of these limitations apply to the automatic die casting process by which the cams are now made with 20% saving. After manufacture, cams are dropped into their proper positions within the metal cells so that the pivot boss of each cam protrudes through the pivot hole in the cell bottom. This pivot boss is swaged into a rivet head. Thus, when the plastic housing is screwed in place, the cam is restrained laterally and the swaged pivot restricts any motion along the cam axis.

ZINC SOLDERING PROCESS JOINS COMPLEX ALUMINUM PARTS

A zinc soldering process for joining aluminum to itself and other metals today is expected to broaden the light metal's use in the refrigeration, automotive, air conditioning, and electrical industries.

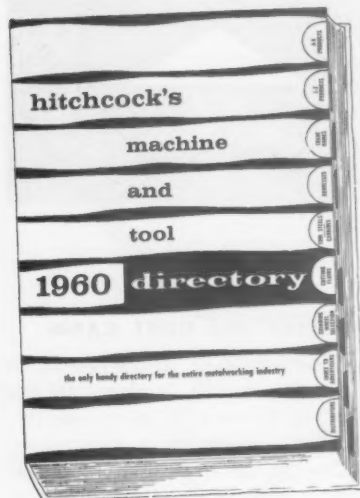
The basic technique is not new—in fact, is the oldest means known for joining aluminum. But Alcoa research engineers found the process especially suited to

bonding thin complex sections, including heat exchangers of all types. Other promising applications include metallurgical bonding of aluminum spirally wrapped or plate fins to aluminum, copper or steel tube, and bonding socketed tube joints and dissimilar metal transition joints.

Test results evidenced that zinc soldered socketed tube joints, ex-

continued

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Reports from the Field, continued

posed to extremely corrosive atmospheres for periods up to a year, showed little or no damage as a result of corrosion. Tensile, hydrostatic, and fatigue tests on

aluminum soldered to copper tube showed strong joints. Finally, aluminum-to-aluminum socketed tube joints displayed greater strength than the tube itself.

CUSTOM AIR SCREWDRIVERS ASSEMBLE U.S. "SMALL" CAR

Cleco Air Tools, Houston, Texas, has designed, manufactured and delivered three different multiple-spindle nutsetters for use in the assembly of one of the new American-made small cars.

One unit delivered to Detroit is a 610NS-10 nutsetter utilizing six air motors for the assembly of carburetors. Because of the close center distances of the screws, two motors require the use of one to one step over gearing to get on

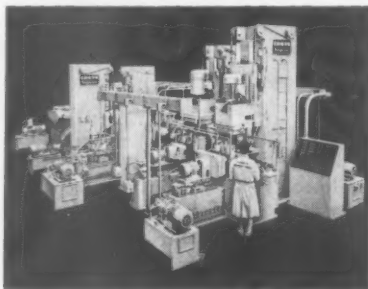
centers. This does the job well.

Another unit is a 614NS-4 nutsetter for assembly of a differential carrier cover. This unit also employs six air motors.

The third nutsetter assembles a lower suspension system to the frame. Because of the close center distances and the torque requirements, all four motors in this unit use a 1 to 1.5 step over gearing to get on centers and thus increase torque output of the motors.

UNCOMMON PART DESIGN LEADS TO NEW TRANSFER MACHINE

A new 30-station transfer machine for drilling, tapping, milling and sawing of crankshaft bearing caps at a rated capacity of 436



A 30-station transfer machine designed for a foreign car manufacturer represents a complete departure from conventional methods.

pieces per hour was designed and built for an European auto manufacturer by The Cross Company, Detroit. New techniques adopted for handling and machining bearing cap clusters represents a complete departure from conventional methods.

Among the major changes in processing and machine features are a lift and carry transfer mechanism, new material handling and fixturing, a new sawing head and fixture, and improved bolt hole processing.

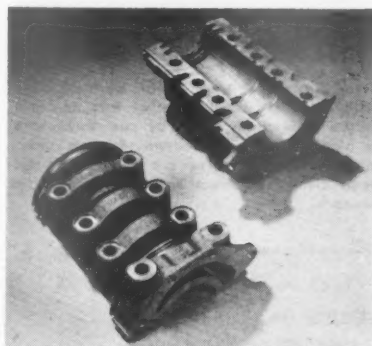
Unlike most American designs, the European bearing caps require a number of drilling, reaming, tapping, forming and milling operations on the end caps. Because of

these operations, the cluster is transferred and machined with the centerline at right angles to the direction of the transfer movement.

Primary attention was given to the bolt hole processing, since the size and location of these holes seriously affects life of the saws employed in cutting the cluster into individual pieces at Station 30. These saws are the most expensive tools used in machining the bearing caps. In fact, they represent approximately 60% of the total cost of all perishable tooling employed in the machine.

In the sawing station, locating pins are placed in all of the bolt holes to hold each cap securely

continued



Bearing cap bolt holes are drilled and reamed from the top face side in the new Transfer-matic with the result that wander from drills ground slightly off center does not affect hole center distances where locating pins enter them for clamping in the sawing station, thus preventing part movement.



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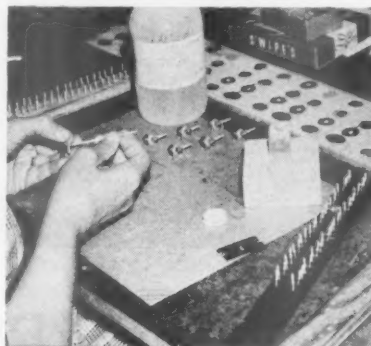
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Field Reports, continued

during sawing and to prevent movement of caps after they have been cut into individual pieces. The slightest movement of the caps pinches the saws as they withdraw from the work, and result in breakage of carbide tips. For this reason, clearances between the locating pins and bolt holes are critically important—bolt hole diameters and center distances between holes must be held within close limits.

In the new machine, this is accomplished by drilling and reaming bolt holes from the side opposite the joint face. With this approach, drill wander from drills that are ground slightly off center does not affect center distance of the holes where the locating pins enter them.

NEW ADHESIVE PERMITS CONVEYORIZED ASSEMBLY



Assembler holds the ceramic element in her left hand prior to inserting into the boot. A drop of adhesive bonds the parts together.

Rapid setting qualities of Eastman 910 adhesive permitted Electro-Voice, Inc., Buchanan, Mich., to efficiently step up production of miniaturized phonograph cartridges and conveyerize its assembly line.

The adhesive can be applied easily and sets in several minutes, allowing components to be moved down the line without delay.

In the assembly operation, a plastic protective boot is slipped over the ceramic transducer which holds two jeweled needle tips. Over these is fitted a nylon case which is inserted into a mount in the tone arm. A drop of adhesive is allowed to flow down between the three parts, bonding them together.

Assembly and Fastener Engineering



PHILLIPS SCREWS...the fastener with a plus!

Recent Phillips Recess Improvements (Here's the fourth way Phillips screws save you money)

- Fillet added at upper edge of recess permits easier driver entry, eliminates burring.
- Revised recess dimensions on fillister heads conform to standard heads, standard drivers.
- Larger recess on size 6 Phillips truss heads gives better driveability, longer tool life.
- Increased recess depth on alloy aircraft parts increases driveability with no loss in strength.

help you fight rising production costs

Compare Phillips cross-recessed-head screws with other types of fasteners—they can save you money four ways.

First, Phillips screws cut assembly time—as much as 50% according to independent plant reports. They start faster because the driver centers automatically, stays aligned, and drives straight. There's no slow down to avoid driver slippage with Phillips screws. Driving in blind or awkward places is faster. They are ideally suited to power drivers and automatic techniques.

Second, Phillips screws end assembly waste. By preventing driver skids, they save costs of replacing or refinishing damaged parts, time loss of disassembly and reassembly, and injuries to workers. Third, because of their extra holding power, fewer or smaller Phillips screws can often be used. This saves cost of screws, labor and/or weight.

In addition to cost savings, another advantage of Phillips screws is improved appearance. These features have led to national acceptance of the Phillips recess in practically every type of assembled product. Today, Phillips screws are made in every type of head configuration to a universal standard by most leading fastener producers. On your next fastening job, specify high quality Phillips screws.

D.4

SCREW RESEARCH ASSOCIATION

(Licensed Manufacturers of Phillips Screws and Drivers)

PHILLIPS CROSS-RECESSED-HEAD SCREWS...THE FASTENER WITH A PLUS

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COLD HEADING!



Top row, left to right: piston pin, wheel nut, ball stud, pump shaft, faucet stem.

Middle row: spark plug body, eye bolt, shuttle tip, ball socket, universal joint bearing cup, splined square-head shaft.

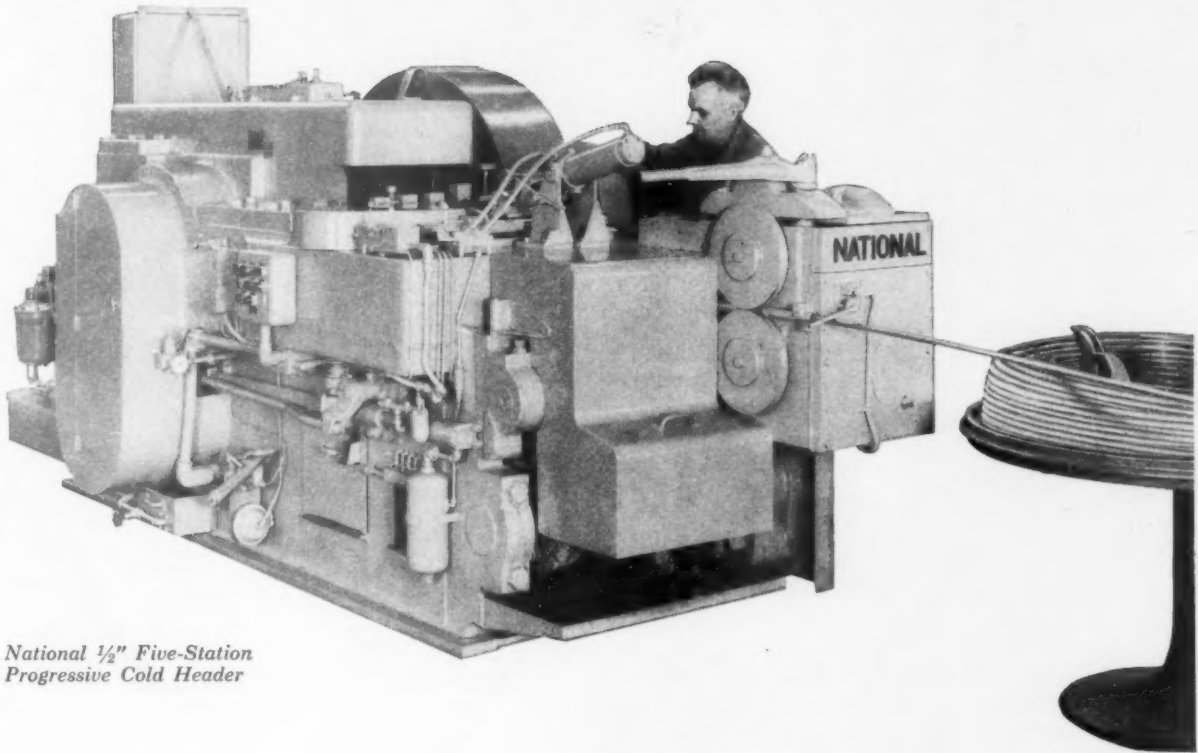
Bottom row: tube nut, tappet plunger, hollow rivet, blind rivet, distributor cap insert, commutator bar.

These are typical parts you can make to advantage, not by wasteful cutting, but by *cold heading* — flowing metal into accurate shapes. All of the above jobs, with one exception, were made complete from coiled wire to finished part, without intermediate annealing and coating, *in one compact machine!*

Why are formerly difficult-to-head jobs like these not only possible now, but commercial? The answer is teamwork, on many fronts. For example:

- (1) More versatile metals are now available in coiled wire. (2) Die materials and lubricants are still better. (3) We are getting important (to us) but usually insignificant concessions from cold-heading-minded parts designers. (4) National Cold Headers, multiple-die Progressive Headers, Cold Formers

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stronger, to amazingly close dimensions!***



*National 1/2" Five-Station
Progressive Cold Header*

and Boltmakers, backed by our fast-growing engineering experience, are now specially equipped to produce reliably the formerly difficult jobs like these shown here.

Are your production problems like these? Perhaps cold heading could pay off for you in a remarkably short time. Let's find out.

Here is our service to metalworking, and you are under no obligation to buy. Send us samples or prints of your jobs. Better yet, bring them to Tiffin where more of our experienced people can participate in *your* problem.

We shall be happy to work with you in developing that better method.

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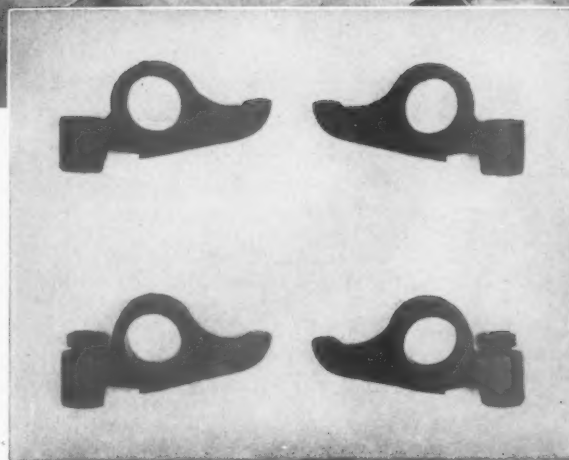
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October, 1959

31



A change in the design of adjustment screws, plus the use of assembly machines, has boosted the rate of production on Rambler valve rocker arms from 300 to 840 an hour. This machine's two drivers are independently set to drive the set screws with at least the minimum torque, and to stall out at less than the maximum torque.



Right and left valve rocker arms, with and without set screws which utilize the principle of interference fit.

Use of assembly machines plus a change in design of adjustment screws helped improve Rambler valve rocker arms. Also, a .012 cent saving on each screw was effected by switching to an outside vendor of fasteners.

NEW ASSEMBLY METHOD IMPROVES ROCKER ARMS

by Darrell Ward, Engineering Editor

Automotive manufacturers must be conscious of every fraction of a cent involved in the rate of production on the assembly line and the cost of parts going into the assembly. Because of sheer volume alone, a fraction of a cent here and there can amount to many thousands of dollars profit or loss at the end of a production model.

American Motors Corporation, like all other car makers, has been conscious of these factors in their Kenosha, Wisconsin, plant. Here engineers and production people alike have been ready to pounce on ideas that save money for the company and provide a better product for the public. The installation of Garvin assembly machines and a change in the design of adjustment screws for valve rocker arms has been a positive step in that direction. During a recent visit to the plant, we were impressed with the three-fold benefits derived from such a simple installation.

THREE-FOLD BENEFITS FROM NEW METHOD

The specific benefits we found were an increased rate of assembly, a saving of \$0.012 each on the adjusting screws by switching from screws formerly made at American Motors to special screws supplied by an outside vendor, and finally, improved product quality with a more reliable screw which requires less frequent adjustment and is easier to adjust when necessary.

The old-type rocker arm was adjusted by loosening a jam nut, turning the special ball-end screw, then tightening the jam nut to lock the screw in place. This type of assembly required two operations: assembling the jam nut to the screw, then the screw to the rocker arm. Additional to this, adjustment in a motor tune-up required greater skill from the mechanic. He not only had to adjust to the nearest 0.001" as specified, but had to allow something for the slight expansion of threads as the jam nut was drawn up to locking tension. A careless mechanic might be inclined to forget this extra allowance and

leave the clearance somewhat more or less than the manual specifies. This could happen in maintenance service at any independent garage and the customer might never know why his engine seemed to have less power or why his engine sometimes would overheat if he employed other than factory-trained dealer service on his car.

The new rocker arms are similar to the old ones with the exception of the set screw. Two different types of new set screws have been used to avoid the locknut-screw combination. Both utilize the principle of interference fit. One is made with two sections of threads of different helix angles, relieved by an offset between the two. The other is made with a radially-deformed thread which tightens against the threaded hole to develop locking torque.

Assembly machines are used for driving the new type set screws on rocker arms for both the six cylinder and the eight cylinder engines. The operation is essentially the same for both. The machine operator takes pairs of rocker arms, a right hand and a left hand, and places them on the right and left arbors of the machine turntable. There are four work stations on the table, each successively indexed into position under the two driver heads at the back.

FOUR WORK STATIONS ON INDEX TABLE

When the operator pushes the control button, the driver heads move down, engage the two set screws (right and left simultaneously), drive to a stall torque, retract, and the table indexes to the next position. After indexing, the assembled parts are automatically ejected into their respective bins at the right, leaving the arbors ready for new parts when they are indexed to the load position.

Parts are held in position on the arbors by spring detents which grip the internal bore of the rocker arms.

An interesting feature of the machine which adds further to the economy of assembly and inspection is that the parts will not eject if the screws are

continued

ALLEN

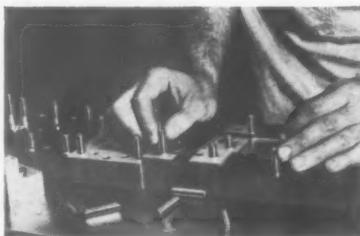


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Rocker Arm Assembly, continued

driven above or below the preset torque range of 30 to 100 inch-pounds. The torque drivers are independently set to drive with at least the minimum torque and stall out at less than maximum. In either case, if the screw should run up too far or cause the driver to stall out too soon, there is something wrong. The assembly will not eject. It remains on the arbor to return to loading position. The operator would, in that case, remove the assembly and discard it as a reject.

The assembly machine is air-driven from an 80 psi supply. One infeed cylinder lowers the head into the work. Upon engagement, the two independent drivers run up to proper depth, ± 0.010 ". Each unit has its own beam-type torque indicator and signal lights. A yellow light burns when minimum torque is being applied. If torque exceeds the upper limit, a red light burns to signal something wrong.

LOW AND HIGH RANGE TORQUE

Each of the drivers is independently regulated for low range and high range torque by set screws at the top of each cylinder. The one on the left is for low range, the one on the right for high.




Adjusting screws are started into the rocker arms by hand, and run up fingertight to approximately two threads engagement before this assembly is sent to the torque driver in parts boxes. Boxes of parts are dumped on the worktable where operator hand loads the machine. Hopper loading was attempted at first, but proved impractical because of close tolerance alignment required to mount rocker arms on the horizontal arbors.

However, this is not considered a handicap in view of the fact that changing to automatic drivers has boosted the rate of assembly from 300 per hour up to a current 840 per hour! The parts are cheaper. And, any good mechanic now can adjust a Rambler rocker arm, knowing it will be gaged to proper clearance after tune up, and will hold more reliably than ever before.



KEYSTONE XL *flowability* is the secret
of volume production at Thompson-Bremer & Co.

DIVISION OF AMERICAN MACHINE & FOUNDRY CO.

 Users of Sems fasteners recognize this familiar symbol as the Everlock trademark of Thompson-Bremer & Co. division of American Machine & Foundry Co., Chicago, Illinois. Using Keystone XL Wire, head cracking is eliminated and die life increased 30%. They manufacture many fasteners in two blows including this 5 diameter Sems,  or this Phillips hex screw with a 4½ diameter head and extruded pilot point.  Keystone and Thompson-Bremer worked together to develop just the right wire to produce a better quality product at a competitive cost. Confidential counseling and metallurgical assistance is yours for the asking, too! Call us.

Keystone Steel & Wire Company, Peoria 7, Illinois

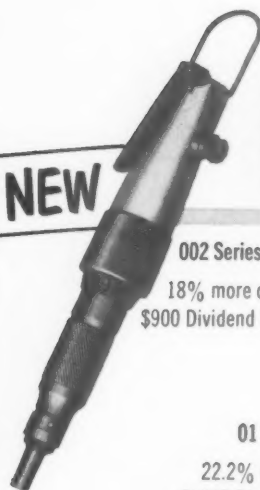


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3 NEW SERIES SCREW DRIVERS

give you an **ANNUAL DIVIDEND**
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NEW



002 Series Screw Driver
18% more output ... for
\$900 Dividend Dollars/year.

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22.2% more output ... for
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If your operators are using older model screw drivers, you can increase their man-hour productivity by as much as \$3750 Payroll Dollars in one year, just by replacing the older tools with one of the three new I-R designs.

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*Whirlpool attaches components
to heavy ribbed base plates with aid of
nuts and studs which are accurately welded in position*

AUTOMATIC NUT AND STUD WELDING

Base plates for automatic washers produced by Whirlpool Corporation, St. Joseph, Michigan, are heavy ribbed stampings to which many mating parts must be assembled.

Several small parts are applied to the base plates in a row of three automated Federal welders linked together with transfer devices. One man operates the whole line. The plate is delivered bottom side up into the first of two stations in the first welder. Here four welds are made to join a flanged hub to the center of the base. Subsequently, four more welds are made on this flange in the second station.

After advance to the second welder, three vibratory hoppers at the first station feed seven nuts over vertical-pointed pins that center the nuts above holes into which collars of the nuts fit. A second fixture checks the nut location. If correct, the machine welds all seven nuts to the base. The base is then pushed into a turnover device and delivered top-side up into the third welder, shown in photo at left.

In this machine, three motor support studs are fastened by a combination of heating current and pressure. This causes the necked ends (that project through mating holes in the base) to be headed over so that the studs grip the base plate midway between their heads and shoulders. Besides making a secure fastening, this method insured that the studs will be at right angles to the plane of the base.

Some of the studs can be seen in the photo on the next page which also shows (at the center) a fixture for holding three studs in a vertical position at the inner end of an air-operated slide. Loading the slide is done automatically, one stud from each of three hoppers above. When both the slide and holder are advanced above the lower die in the third welder, all three studs are released and drop into mating sockets in the die. The slide retracts and the lower die is elevated, pushing each stud into

continued



In last of three welders in automated line at Whirlpool, three studs for motor supports are fastened to base plate for washer.

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A. MILBAR CLOSE-CLEARANCE RATCHET WRENCH for tightening or removing twelve-point or hex-head screws and nuts. Fits in the tight spots where regular wrenches won't work. Smooth ratchet action. Several sizes available. Widely used in aircraft and missile industries.

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C. MILBAR SNAP RING TOOL—the original and most widely used tool with replaceable points of different shapes and sizes. Tool lasts forever—just change points for the job at hand or when they wear out. Special points for holeless snap rings.

D. MILBAR WIRE TWISTER—for smooth, automatic one-hand operation. Extra large serrated jaws assure a longer life and non-slip grip. Spring return and squeeze release eliminates need for shifting hands. Twists and cuts wires with no waste motion.

E. MILBAR GEARED RIGHT-ANGLE TOOL—for easy access to "tight" spots. Fits all standard $\frac{3}{8}$ " drive extensions, sockets and ratchets. Reaches around corners and delivers increased torque for tightening or removal. Eliminates unnecessary removal of parts to get at the job to be done. Fully proven and tested by thousands of users.

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Welding Nuts and Studs, continued



Necked studs, fed from three hoppers, drop into carrier on end of slide which then advances and deposits the studs in holes in lower die of welder at left.

its mating hole of the base plate which has been clamped securely in position.

When the studs are thus inserted, the smallest step diameter projects above the top face of the plate and the intermediate diameter is in the hole. The upper die of the welder is lowered, forcing one electrode against the top end of each stud. Current applied heats the small diameter of each stud until it becomes soft enough to expand under pressure, thus forming a head.

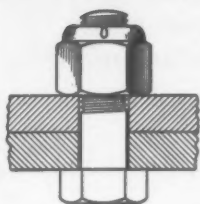
When heating is completed, current is shut off automatically. Both dies retract, leaving all three studs securely fastened to the base, which is then ejected to complete the cycle.

With this setup, 224 base assemblies per hour are produced with the assistance of only one man. In the previous setup, using the same welding equipment, three men were required, and output was only 200 assemblies an hour.

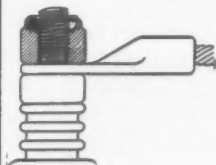


Ten fastening problems solved by ELASTIC STOP nuts

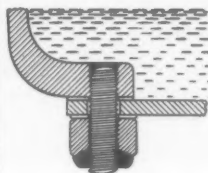
TIGHTENED AGAINST THE WORK



Vibration and impact proof bolted connections in standard applications.

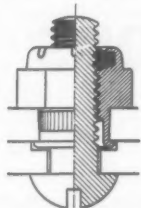


On all electrical terminals subjected to vibration in transit or operation, and for any electrical or electronic assembly where positive contact must be maintained.

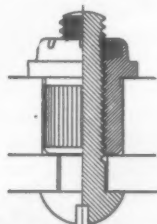


To seal bolt threads where leakage past stud threads must be prevented.

FOR MANY SPECIAL FUNCTIONS



Blind fastening applications where nut is "clinched" into sheet metal ... becoming self-retaining as well as self-locking.

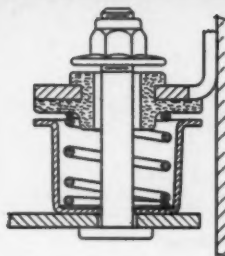


To eliminate drilling and tapping and provide steel thread strength for soft metals, an ESNA spline nut is pressed into a bored hole in casting.

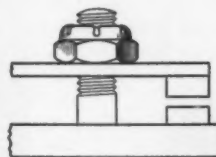


Simplified self-aligning self-locking fastener for bolting two non-parallel surfaces.

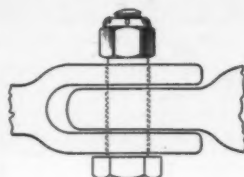
LOCKED ANYWHERE ON THE BOLT



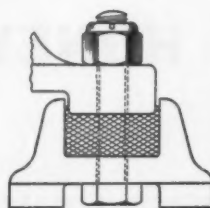
Spring-mounted connections or dynamic balancing, where nut must stay put yet be easily adjusted. (Flanged face eliminates need for extra washers.)



On make and break adjustment studs where accurate contact gaps must be maintained. Note "thin" height design for limited clearance.



For bolted connections requiring predetermined play.



For rubber-insulated and cushion mountings where the nut must not work up or down.

HOW THESE NUTS SOLVE SO MANY FASTENING PROBLEMS, ELIMINATING EXTRA PARTS AND OPERATIONS...

The red locking collar of an ELASTIC STOP® nut grips bolt threads with a perfect fit that will not loosen under severe vibration or stress reversals, and seals against liquid seepage. By bringing nut and bolt metal thread flanks into firm contact it eliminates wear producing axial play. The elastic locking action of the insert-type stop nut does not distort or gall bolt threads. It is reusable many times.

Send for the following free information: Elastic Stop nut bulletin; Rollpin® bulletin. Or enclose a drawing of your product for specific self-locking fastener recommendations. Write to Dept. N30-1097

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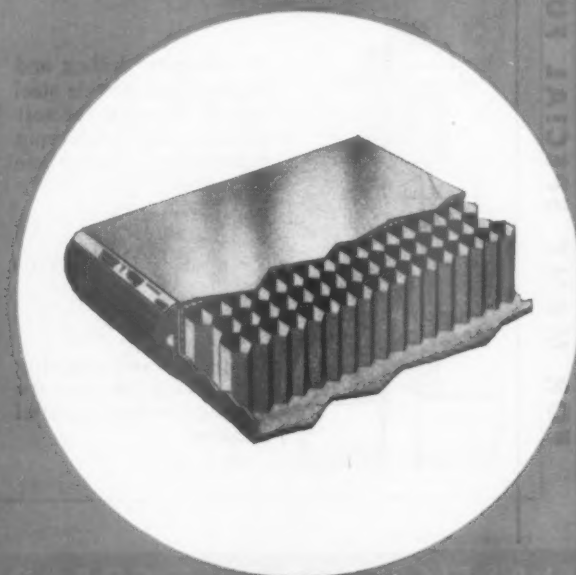


ELASTIC STOP NUT CORPORATION OF AMERICA
2330 VAUXHALL ROAD, UNION, NEW JERSEY

*Filled with just paper?
True. But these desk tops of
kraft honeycomb, bonded between
steel skins, are three times
stronger than previous models.*



BONDING HONEYCOMB DESK TOPS





by Ray H. Smith, Associate Editor

Paper honeycomb core bonded between facing steel skins will form a desk top panel one-third lighter and three times flexurally stronger than comparable built-up metal tops.

Since coming to this conclusion in 1953, All-Steel Equipment Inc. of Aurora, Ill., has gradually converted its office desk top production to this new design. This is a striking example of how honeycomb in its low-cost, non-metallic form is being skillfully engineered for applications outside the aircraft industry.

The sandwich core used by All-Steel—made of 60 lb. kraft paper—is divided into a network of cells $1\frac{1}{4}$ -in. thick and $7/16$ -in. in diameter. Aircomb, manufactured by Douglas Aircraft Co., Inc., is impregnated with phenolic resin for greater rigidity and resistance to fungi and moisture.

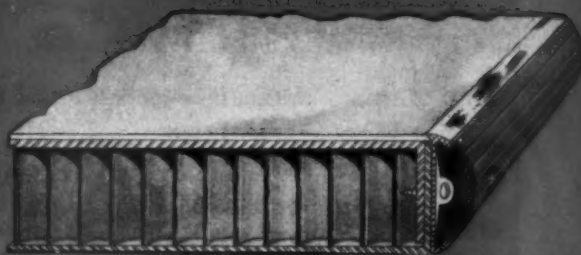
What gives the core its advantage over more conventional structures is an impressive strength-to-weight ratio. Some finished panels exhibit shearing strengths of over 20,000 psi. As for rigidity, an important factor in desk tops, one estimate is that an equally rigid plywood panel would be five times as heavy as honeycomb; aluminum, ten times as heavy; steel, sixteen times as heavy. It is the elementary principle of spreading a load over a number of small units—here, the structural strength of many little columns—which explains this rigidity.

It was the promise of a vastly more durable desk that led All-Steel to make the plunge into a then pioneer field, the "civilian, domestic" use of honeycomb. At the time, All-Steel's desk tops were fabricated of 19-gauge steel skins stiffened by a welded structural grid of bars. When subjected to normal office wear (e.g. sitting on the edges, elbow-leaning, twisting and banging during moving), the top, after about four years, would sag noticeably and a pencil would run down between sections. Honeycomb's perfectly flat surface and its rigidity have eliminated this problem. The flatness has also greatly improved the bonding process when the tops are covered with laminated sheets, such as Textolite and Formica.

There is no question, however, that the performance characteristics of the finished honeycomb panel are dependent to a large extent on the properties of the adhesive used to join core to skin.

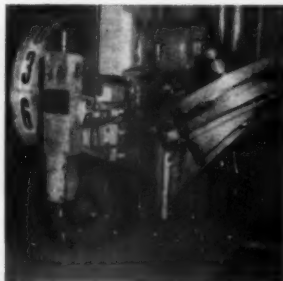
The use of adhesives was not entirely new to All-Steel or to Paul Daley, process engineer, in charge of the project. The desk's surface covering of Linoleum, Textolite or Formica was formerly bonded in a hand spraying and hand roller operation. But this was a far cry from the 700-ft. line, equipped with

continued



Cross sectional view of desk top shows paper core bonded between overlapping steel wrapper sheets. Aluminum trim is attached with sheet metal screws.

Tomkins-Johnson machine drops clinch nuts in skin's punched holes (Fig. 1), for fastening desk top to pedestal and drawers. At start of assembly line, operator feeds core into Black Bros. glue spreader (Fig. 2) and also starts brake press-formed skins into adjoining adhesive-spraying unit. Honeycomb emerges from double-coating spreader (Fig. 3), continuing along roller conveyor.



1



2



3

Bonding Honeycomb Desk Tops, continued

spraying equipment, ovens, and roller presses, which now assembles the complete desk top semi-automatically. All-Steel officials also point out that their assembly line, though fairly standard in honeycomb panel production these days, was the result of original engineering thinking several years ago.

Extensive tests for both tensile strength of bond and static load flexure strength of the top were made before a type of adhesive was chosen. Experiments with new types continue.

Today a semi-thermoplastic contact adhesive is specified. It is being supplied under different brand names by Armstrong Cork, Angier, and Pierce & Stevens.

This neoprene-based adhesive has the heat sealable characteristics of a thermoplastic and yet ex-

hibits some of the strength characteristics of thermosetting adhesives. Of synthetic rubber, it has been compounded with resin to give the proper degree of adhesion, tack, aging properties and bond strength for this particular application. It reaches maximum strength through evaporation of solvent and, although the bond sets firmly and permanently upon initial pressure, it continues setting at an accelerated rate for two weeks, reaching final strength in two to three months.

One necessary feature of the adhesive is its resistance to dead-load stresses. Dead-load strength is important since seldom are mill-supplied 22-gauge stretcher level steel sheets perfectly flat. When the warped or bulged areas are made to conform to the flat surface of the core, a constant tensile stress is set up between the core and the skin. All-Steel's adhesive overcomes this and maintains panel strength. •



4



5



8



9



6

Two men assemble core and skins (Fig. 4). Inside of skins have been coated and passed through 31-foot infrared oven which force dries the adhesive, leaving it tacky. Assembled top is reheated and roller pressed before being sent through another transverse sprayer along with its plastic laminate top covering (Fig. 5). Scotch grain texture adhesive is sprayed .010" thick (Fig. 6) and dries to .002" thickness. Semi-thermoplastic adhesive is supplied in 50-gallon drums, transferred to a pressure drum where equipment (Fig.

7) pumps it to spray guns. After the surface covering is fitted and trimmed, the top is again rolled under 100 lbs. pressure per lineal inch in a rubber-faced press. Top is checked for flatness with a straight edge bar (Fig. 8). Any waves or dents will pass light under the bar and any imperfections checked by a feeler gauge will lead to the top's rejection. The tops are fed upon demand from a conveyor to roller work tables where metal edging is fastened using pneumatic screw drivers (Fig. 9).



7

stitching together a giant radome



Radome designed and built by Long Sault Woodcraft Limited, St. Andrews East, Quebec, for the United States Air Force RADC.

Looking upward from the inside of the world's largest stressed skin sandwich radome built of translucent fiberglass panels, securely joined by hundreds of DUAL-LOCK fasteners.

Radar antennae along the upper perimeter of North America's defense system are enclosed by protective domes which stop ice, snow, and gales up to 150 mph.

This precisely engineered pattern of fiberglass panels is erected quickly and surely, under the most adverse field conditions, using recessed Simmons DUAL-LOCK fasteners.

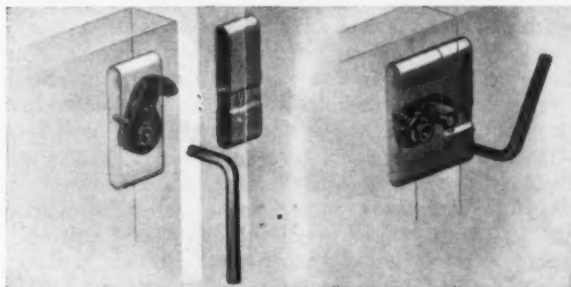
DUAL-LOCK is ideally adapted to panel fastening for military shelters, demountable shipping containers, aircraft cowlings and guided missiles.

Features:

- High load characteristics. The standard No. 1 DUAL-LOCK withstands 2500-lb. tension, and with modifications, tension loads of 7000 lbs. and over.
- Double-acting take-up provides great closing pressure, with minimum pressure on operating tool.

- Positive-locking. Trigger action insures fully open and fully closed positions.
- Vibration-proof and impact-proof. Will not accidentally unlock or loosen.

Write for catalog #1257. Complete specifications, drawings, details of DUAL-LOCK and other Simmons Fasteners with unlimited money-saving applications.



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Glen Ayers lectures employee-students at Douglas on the NACA riveting technique. All persons engaged in riveting on the new DC-8 Jetliner must take this course, regardless of their previous aircraft riveting experience.



THE DOUGLAS FASTENER SCHOOL

Bells don't ring at this school, nor does it have a football team. People are paid for attending, and graduates don't have to look for a job because they already have one!

Aside from these differences, the fastener school at the Long Beach (California) Division of Douglas Aircraft Company might be compared to any good technical school providing short courses in specific subjects. Lectures are followed by practical shop work to show whether or not the student has absorbed the spoken word. Oral and written examinations are given. Some students pass; some fail. Those who succeed receive "diplomas" in the way of recognition of ability to perform certain types of assembly work from which others are excluded.



Courses range all the way from the correct interpretation of a blueprint to the production of a mirror-finish hole for fastener installation

by William D. Engstrand, West Coast Editor

Organized in 1949, the fastener school has 11 instructors. Glen Ayers, a veteran of 17 years of technical teaching, is coordinating instructor of the school. Approximately 20 courses are in progress at the current time, all dealing with vital phases of aircraft production, and most of them dealing with some phase of fastening. Subjects range all the way from correct interpretation of blueprints to the production of a mirror-finish hole for fastener installation.

"The number of courses given varies," Ayers says. "Some are continuous like the course given to beginners in the NACA technique of riveting. Other courses are sporadic, and given only when production requires training of additional personnel in specific types of work. A course is dropped when the specific fastening technique it covers becomes obsolete, or is not used any more. Other courses must be developed when new fastening techniques are placed in use. None of the courses are designed to give the student a generalized knowledge of fastening. Each course deals with a specific production job."

Classes may vary from 25 down to one student, depending on requirements. Length of the courses vary from as little as 8 hours to as many as 40 hours of instruction, again depending on the complexity of the subject. Students to attend the school are selected by supervision, and the average employee selected, Ayers says, is gratified at the opportunity thus offered him, and is more than willing to study and absorb the knowledge made available.

STUDENTS ATTEND ON COMPANY TIME

Students attend the school on company time and at full pay. Material for the courses is prepared by the instructors. When a new fastening technique is developed or instigated at the Douglas plant, it is first thoroughly studied from the engineering standpoint and correlated with Process Engineering as regards quality control. The mechanical or shop aspects of the new technique are then thoroughly investigated. Thus, when the course material is finally put together, it meets with all engineering, quality control, and shop requirements.

The only common feature of nearly all fastening courses is a thorough study of the Methods drawing covering the operation involved. "Correct blueprint or drawing interpretation is absolutely necessary for any shop operation," Glen Ayers points out. "The best mechanical ability is wasted when used in the

wrong direction. This waste can be eliminated by the ability to properly interpret the instructions contained in a drawing."

Perhaps the most generalized course of all is the one dealing with the NACA technique of riveting. This technique is used for all riveting on the new Douglas DC-8 jet transport airplane. Everyone, regardless of past experience, must take and pass this course before he is permitted to do any riveting on the new airplane. As a consequence, this course runs continuously with up to 25 students attending at a time.

COURSES ON FASTENER HOLE PREPARATION

Many of the courses deal with preparation for fastener installation. This is a vital phase of aircraft work, as holes, countersinks, dimples, etc., must be prepared in a rigidly prescribed manner. Any roughness, burrs, or other faults may result in stress concentration points with subsequent rapid fatigue and failure in highly stressed areas.

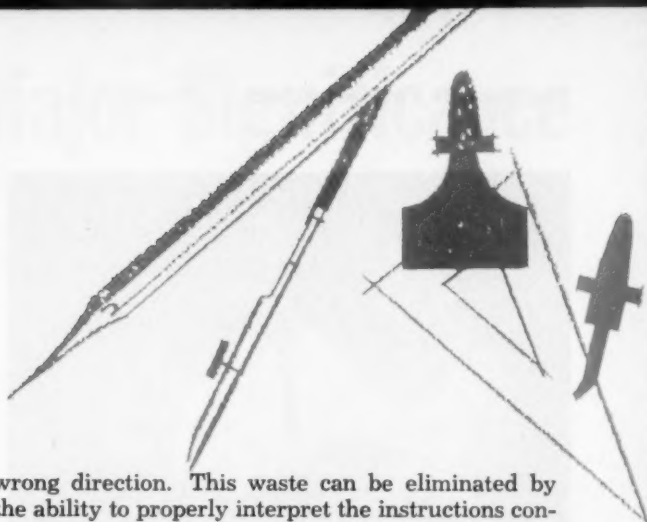
In courses covering some of the more vital operations, such as the installation of lockbolts, blind fasteners, etc., the student is issued a card upon successful completion of the course. He must then present this card when he wishes to withdraw the tool necessary to accomplish the work. To control the situation, tools are not issued to anyone without a card.

Schedules of most courses are quite similar. Lectures come first, followed by actual shop work under the eye of a qualified instructor. An evaluation sheet is maintained on the student's progress. Special qualifications along with shortcomings are noted on this sheet. At the end of the course, the student must complete either an oral or written examination which may take anywhere from 45 to 60 minutes. The results of the examination are also noted on the evaluation sheet. The evaluation sheet (or a report) then goes to the student's immediate foreman or supervisor. If he has failed in any specific phase of the work covered, such as showing a tendency to repeatedly drill holes oversize, he is not allowed to do that type of production work.

Actual fastener courses now being given include riveting, drilling, and countersinking, and the installation of different types of blind fasteners. Some of the classes are regularly scheduled; others are given only when needed.

Many of the courses deal with proper operation

continued





In first of a series of shop tests, this student expands a fastener hole, using a stainless steel bushing, a tapered pin, and a puller—under watchful eye of Glen Ayers.



Next the student uses a portable drill and countersinker.



Here she does a coining operation around a fastener hole.

of the many different machines used either in installing fasteners, or directly related to fastening. One such course covers operation of the Spacematic drilling and countersinking machine; other courses cover automatic riveting, hot and cold dimpling, coining, broaching of holes, hole expansion techniques, etc.

SKILLED HELP VS. FASTENING TRENDS

"There is a sharp trend toward machine fastening in all phases of aircraft production," Glen Ayers points out. "Most of these machines are quite complicated and temperamental, and can't be operated by just anyone. Operating a hot dimpler, for instance, requires specialized knowledge. Employees who successfully complete the course in hot dimpling receive a badge which they must wear at all times while working. They also receive two stamps for marking their work.

"The same applies in our course on coining. This is a critical operation as it is performed in stressed areas where a mistake could be costly indeed. People who complete our course in coining receive a stamp to mark their work. If they are not actually engaged in coining work within two weeks after completing the course, the stamp is picked up."

COORDINATION WITH PROCESS ENGINEERING

In the interest of quality control, the fastener courses are coordinated with Process Engineering during development of course information. In many cases, Douglas Process Standards are used directly in the course. This assures that all instruction will be well in line with rigid aircraft quality requirements.

It should be pointed out that not all courses in the school deal with fastening. There are auxiliary courses for supervision, such as human relations, etc. But the vast majority of the courses deal directly with production shop activities, and most of these deal with some phase of fastening. And as to their value, the remark of a fastener company representative is most revealing . . .

"Since you started your training courses, I don't get trouble calls anymore," he told Glen Ayers. •



This shop test is concerned with broaching a fastener hole.

Announcement of Major Significance

FOR EVERY USER OF SOCKET HEAD CAP SCREWS

Following exhaustive studies begun in 1954, the socket screw products industry adopted, on April 24, 1959, new dimensional standards for socket head cap screws. Standard Screw Company participated in these studies and concurred in the recommendations approved by leading fastener manufacturers.

Adoption of the new standards, to be known as the "1960 Series", has important implications for every user of socket screws. As a public service Stanscrew will point out these implications . . . not only in relation to its own products, but also to the overall program of the industry.

Differences, Advantages Of New Design

The "1960 Series" has been carefully engineered so there is functional uniformity for all sizes, particularly as it applies to wrenching areas and to the relationship of head diameters to body diameters. For most sizes, as illustrated, this means substantial increases in both head diameter and socket size, and thus provides these advantages over the present design:

1. *Maximum utilization of the fastener's inherent strength . . . larger wrenching area permits application of greater clamping force.*
2. *Increased bearing surface under the head . . . up to 233% more.*
3. *Minimum indentation . . . particularly important with softer metals.*

Should You Convert Now?

Obviously, for many applications, the new design offers important benefits which indicate conversion as rapidly as possible. In some cases, however, existing product design may not accommodate the larger heads . . . or, where socket cap screws are countersunk, revising your countersinking operations may create significant production problems. Stanscrew urges, therefore, that each company learn complete facts on the fastener industry's future plans.

Timetable For Industry Changeover

Stanscrew has already started production of the new "1960 Series". Manufacture of the present (1936) series will continue, however, and they will be available as standard, in-stock items until at least January 1, 1961. At that time, it is now contemplated the "1960 Series" will become the accepted standard throughout industry and the "1936 Series" will then be furnished only when specifically ordered.

When Designing A New Model

For products now on the drawing board, this timetable indicates many manufacturers should plan to use the "1960 Series" as the standard for later production. By making such design provisions, you assure maximum acceptance and minimum difficulty in the future.



STANDARD SCREW COMPANY

FASTENERS

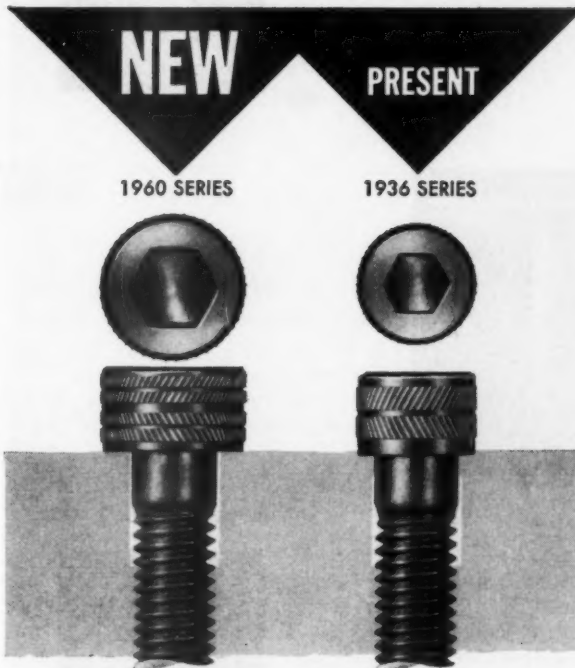
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2701 Washington Boulevard, Bellwood, Illinois

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For Existing Products

For many existing applications, where socket cap screws are not countersunk, either the 1936 or the "1960 Series" may be used. In frequent cases, improvements of the 1960 design suggest conversion within a short period. In other applications, where the heads are countersunk or where the greater head diameters of the "1960 Series" create a problem, changeover should probably be postponed until a general redesign of your product is scheduled.

Special Stanscrew Marking

To further distinguish its "1960 Series", Stanscrew will knurl heads of all new style socket cap screws with a split herringbone design (as shown). This special marking and the new "1960 Series" box labeling will provide quick identification of these quality fasteners.

For Further Information

Your Stanscrew distributor has the latest facts on the new "1960 Series" and will be happy to discuss them with you. If desired, he also will arrange for a prompt visit from a Stanscrew fastener specialist who will be most happy to go over all aspects of this new industry program as it regards your own particular operation.

Stanscrew also has a new brochure which provides complete dimensional and design data on the "1960 Series". No obligation, of course, for your copy.



WHAT YOU READERS L

During the past year, our research and reader service departments have been studying and correlating information concerned with the editorial needs, desires and interests of you readers whose prime responsibility is assembling and fastening the products of American industry.

This is a continuation of our earlier research which indicated the need for an editorial voice in this field. And this research will continue so that we will be kept aware of your editorial needs in various problem areas.

We have found three basic types of feature articles of keen interest to you. One type deals with "reliability" of products, whether that product be an appliance, a business machine, or a missile. A second type is concerned with the "design and application" of different types of fastening and joining materials. The third is concerned with the inseparable problem trio of "torque, tension and tightening."

Following is a breakdown of the articles which you readers "liked best" in our first 12 issues. These results are based on your write-ins on inquiry cards, and correlate closely with results of separate surveys made to various sections of our circulation list. Many of you had difficulty choosing the "best liked" article in several issues, and listed two or three as your choice. These could not be included in our tabulations, although we are naturally pleased that many of you could not pick one article over another as being liked-best.

OCTOBER—PRODUCT RELIABILITY

Of the seven major articles in our first issue, the article liked-best was "The Missiles Age Hurls a Challenge—Product Reliability."

The next best-liked article in that issue was "The Design and Application of Set Screws." Third place went to "High Temperature Brazing."

NOVEMBER—SPACE AGE FASTENERS

Of five major articles, the best-liked was the cartoon-studded "Fasteners in the Space Age." Second place went to a story featuring applications of

by Matt E. Heuertz, Managing Editor

RS LIKED BEST IN VOLUME ONE

"Stainless Steel Fasteners," while "Welding Precision Components" came in third.

DECEMBER—HOW TIGHT IS TIGHT?

In this issue appeared our first article concerned with torque, namely "How Tight Is Tight?". It came out on top, but only by a narrow margin over two strong competitors, namely "Standardization Aids Research and Production" and "The Tensile Area of Threads."

JANUARY—RIVET APPLICATIONS

"Let's Discuss Rivet Applications" won this race from four competitors, although "Plug Nuts Save Tapping" finished strong.

FEBRUARY—WHAT IS PROPER TORQUE?

Here was a landslide for "What Is Proper Torque?", an article which explained this matter of torque in a layman's language. This article carried the high total of the year, as it was liked best by 83 percent of you readers. In addition, many of you commented that this was the best down-to-earth treatment of this subject ever published.

MARCH—TORQUE, BONDING, ELECTRONICS

Here was a close three-way race between "How to Determine Torque-Tension Relationships," "Bonding of Helicopter Blades", and "Assembly of Precision Electronic Products." The torque article just barely nosed out the other two for top honors.

APRIL—HOW CLARY BUILDS RELIABILITY

Once again, reliability comes through. "How Clary Builds Reliability at Low Cost" was liked best over four competitors, although "Quarter-Turn Fasteners in Product Design" was a close second.

MAY—TIGHTENING FASTENERS

After three interpretive articles on the subject of torque, we published a technical article entitled "Tightening Threaded Fasteners." It hit the top of the ladder. Finishing a strong second was "The Design and Application of Retaining Rings."

JUNE—POWER TOOLS

A sequel to the previous month's best-liked article was "Power Tools for Tightening Threaded Fasteners." It took top honors. In a tie for second were "New Assembly Technique By-Passes Deep Drawing" and "Engineering Skill Reaps Profit from Small Parts."

JULY—WELD FASTENERS

Like other articles in a similar vein on other fastening methods, "The Design and Application of Weld Fasteners" hit a responsive note as liked-best by you readers. However, it received a good race from "How Good Are the Self-Tapping Screws You Buy?"

AUGUST—WELD FASTENERS, SOLID PINS

Here was our first tie for first place—between "Let's Consider Applications of Solid Pins" and "Equipment and Techniques for the Application of Weld Fasteners."

There was also a tie for third place between "Semi-Automated Assembly of Circuitry Board" and "Muffle Noise and Boost Efficiency."

SEPTEMBER—THE DC-8, PRINTED CIRCUITS

Based on fragmentary returns, "Building the DC-8 Jetliner" is in the lead, possibly with an assist from all the publicity this new plane was getting in September from its first commercial flights. However, the article, "Printed Circuits for TV: Efficient and Reliable," has been closing the gap in later returns.

Equally as important as your comments on our major feature articles are your comments on our "ideas" and "field reports." These also give us a clue to certain problem areas which require more editorial coverage.

In any event, your comments are always welcome, even the humorous ones. A reader at Motorola im-
pishly suggested that he would like to see an article on "toothpicks." He may be surprised if our "Wood Working Digest" should come up with an article on this subject in the near future.



DESIGN BREAKTHROUGHS

in fastener engineering

One of the earliest and most basic breakthroughs in fastener design was the common clothes pin. And, although DOT is not a manufacturer of clothes pins, many a DOT industrial fastener has had an equally revolutionary effect on modern fastening technique. Hundreds of different DOT fasteners have created relatively minor revolutions in specific industries.

A DOT fastener may save a few man-minutes of labor. It may save material. Or it may improve product performance and hence saleability. But multiply each small improvement by the number of units in a true mass-production operation and the savings really pile up to impressive proportions.

Rather than spend your own design staff's time on fastening problems, it might pay you well to call in DOT. You'll have at your service a design and production organization with large-scale facilities for genuine mass-production of special-purpose fasteners and self-fastening devices of all kinds.

Supplementing the Carr Fastener Company are a number of other plants which form the United-Carr Fastener group. They are located in the principal production centers of the United States, Canada, England and Australia. Your nearest United-Carr field office (see below) is no further away than a telephone call from your desk.



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Division of United-Carr Fastener Corporation • Cambridge 42, Massachusetts

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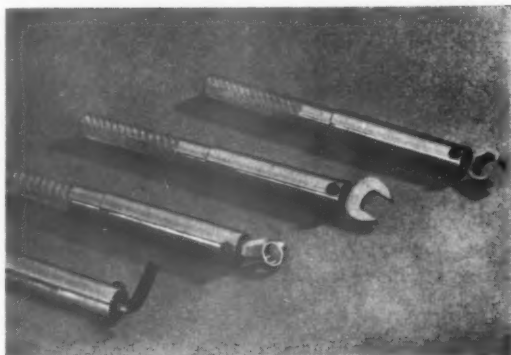
Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, New York, Philadelphia, Syracuse

MANUFACTURER'S

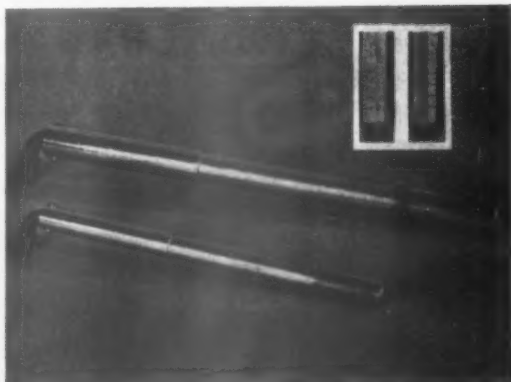
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WHEN TO USE SNAP-TORQUE WRENCHES

Wrenches which give an audible snap when the correct torque is reached are ideal for use in hard-to-reach or blind places



Pre-set torque wrenches of this type are designed to give an audible snap or "pop" when the correct torque has been reached.



Adjustable torque wrenches also "pop". Scales are graduated in either inch-pounds or foot-pounds.

by **Richard Skidmore**, President
Skidmore Engineering Company

As mechanical equipment gets more and more complicated, the need for absolute dependability in threaded fasteners becomes increasingly vital, for the failure of any one fastener may cause breakdown of the entire unit. This becomes even more important if the fasteners are not readily accessible for retightening.

The technology of fastener manufacturing is such that high quality fasteners are readily available. However, these fasteners may fail or shake loose simply because they were not properly tightened when the machine was assembled.

Experience shows that properly tightened fasteners rarely come loose even under the most severe operating conditions. Practically all of the major fastener manufacturers stand ready to assist users in the selection of the correct torque specifications for any given application. Only by insisting on the correct torque can engineers be assured that specifications are being met.

Among the most practical tools available for this purpose is the snap-torque wrench. It is a rigid handle tool with a built-in release mechanism to signal the user when the desired torque has been applied. The signal can be both heard and felt, and the user knows that the fastener has been properly torqued.

Snap-torque wrenches are available in two types: factory pre-set and adjustable.

The factory pre-set type are ideal for applications where many identical fasteners are to be

continued

Use of Snap-Torque Wrenches, continued

torqued, such as on a high production assembly line. These wrenches are ideal for final tightening following initial run-up with power wrenches. In some cases, where power tools are accurate enough to meet specifications, these torque wrenches can serve as inspection tools for spot checking. They are especially useful in torquing fasteners in hard-to-reach places.

Pre-set wrenches are practically fool-proof. The operator merely uses the tool which fits the head of the fastener and tightens until the wrench snaps. A variety of head types can be obtained, such as offset box, open end, or hex key for socket screws. A good application of this type is in the torquing of flare nut fittings in jet aircraft. Another is found in adjusting automatic transmissions in passenger cars. In both cases it would be impossible to torque with any other tools because of close working quarters.

The factory pre-set torque wrench also has isolated applications where a torque requirement must be met by many different assembly workers. They can all obtain the correct torque value without supervision or instruction. For example, these tools can be used on machine tools for clutch adjustments and on grinder spindles for torquing the nut which secures the grinding wheel. In these cases the torque wrench is kept right with the machine for use by the machine operator only. This eliminates the confusion which might be experienced if an adjustable wrench were used.

The obvious disadvantage of pre-set wrenches is that a different wrench is required for each application.

For general use, adjustable snap-torque wrenches are ideal tools. They are limited to the male square drive head to which standard sockets may be applied. The required torque is set by the mechanic,



This worker in an electrical products factory uses adjustable torque wrench for final tightening of a series of nuts, each of which requires a different torque value.

and the tool is then used in the same manner as the pre-set wrench. The adjustment is made easily in a few seconds.

One mistake easy to make in the selection of torque tools is the use of adjustable wrenches where only a limited number of jobs are being torqued. Factory pre-set wrenches are considerably less expensive than the adjustable type. They are generally more compact, lighter in weight, and handier to use. In many cases, users have found it more economical to buy factory pre-set wrenches for each job rather than use one adjustable wrench on which the setting must be changed back and forth. Errors are much less likely to occur when such a program is used.

It should be kept in mind that one loose fastener can often mean a service call which could easily be more expensive than the cost of torque tools. •



Left: In aircraft industry one use of snap-torque wrenches is found in the overhaul of landing gear. Another use is for propeller installation.

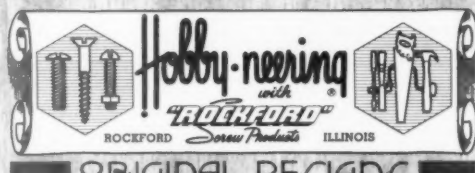
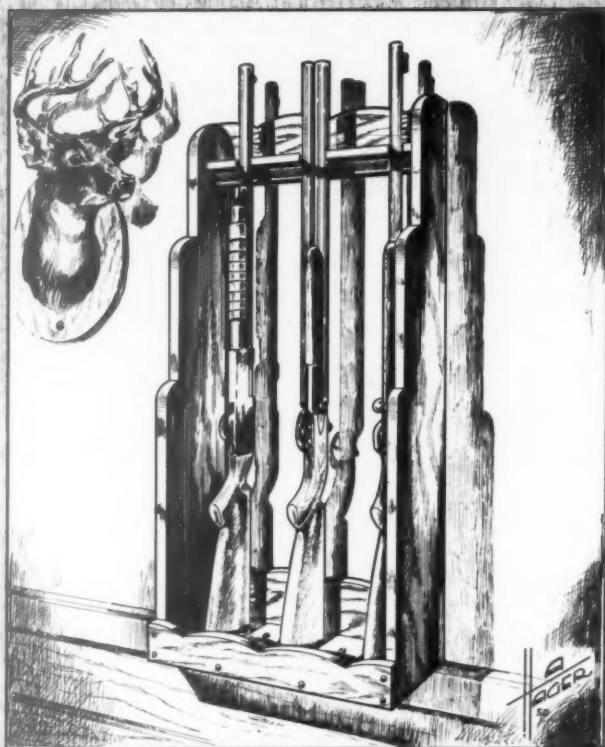
Below: Here the assembly of hydraulic cylinders is completed by drawing all nuts up to specified torque value.



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Rockford, Illinois



ORIGINAL DESIGN

OCTOBER 1959

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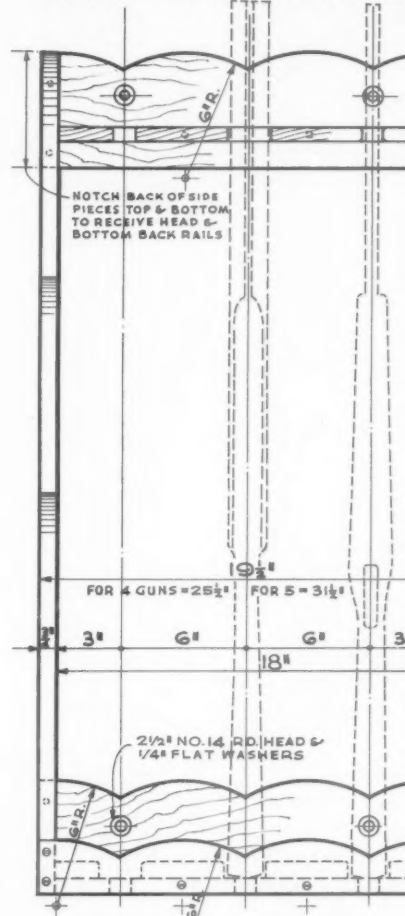
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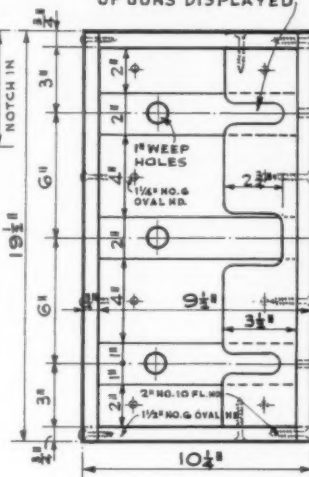


FRONT ELEVATION

G-2-59
7-20-50

SECTION

WIDTH OF SLOTS TO
BE MADE TO FIT TYPE
OF GUNS DISPLAYED.



TOP.VIEW

LUMBER.

2	PCS.	3/4" x 9 1/2" x 40 1/2"	SIDES
1	PC.	3/4" x 8 3/4" x 18"	FLOOR
1	"	3/4" x 3 1/2" x 18"	BARREL SUPPORT
2	PCS.	3/4" x 5 1/2" x 19 1/2"	BACK RAILS
1	PC.	3/4" x 2 1/2" x 19 1/2"	FRONT RAIL
2	PCS.	3/4" x 2" x 8 3/4"	BUTT GUIDES
2	"	3/4" x 4" x 8 3/4"	"

"ROCKFORD" WOOD SCREWS

4 2 1/2" NO. 14 ROUND HEAD
4 1/4" FLAT WASHERS
12 2" NO. 10 FLAT HEAD } NICKEL PLATED
8 1 1/4" NO. 6 OVAL #
6 1 1/2" NO. 6 " "

NOTE:

IF RACK IS TO ACCOMMODATE MORE THAN THREE GUNS, WIDTH CAN BE INCREASED BY 6" FOR EACH GUN. (FOR COMPACTNESS GUN SPACING CAN BE MADE 5" INSTEAD OF 6")

HAGER DESIGN STUDIO

- ARE YOUR GUNS IN GOOD CONDITION FOR THE HUNTING SEASON? HAS THE OLD DOUBLE BARREL OR RIFLE BEEN CLEANED & OILED AND IN SHAPE FOR INSTANT USE? OFTEN NEGLECT IS DUE TO STOWING OUR GUNS AWAY IN THE CLOSET FROM ONE SEASON TO THE NEXT.
- THEY DESERVE BETTER TREATMENT AND WOULD MAKE AN ATTRACTIVE DISPLAY IN DEN OR RUMPUS ROOM IF WE HAD A GUN RACK
- SO NIMRODS LET'S GET BUSY ON PROJECT NO.9 AND MAKE THIS PRACTICAL GUN RACK FOR THOSE FINE GUNS OF YOURS.
- SHOULD YOU OWN MORE THAN 3 GUNS ADD 6" TO THE WIDTH OF RACK FOR EACH ADDITIONAL GUN.
- SELECTION OF TYPE OF WOOD IS OPTIONAL: PINE, CEDAR, REDWOOD, OAK, BIRCH OR PLYWOOD AND FINISHED NATURAL OR STAINED TO MATCH ROOM TREATMENT.
- ATTRACTIVE GAME BIRD DECALS APPLIED TO SIDES OF RACK WILL ADD INTEREST.
- TO KEEP DUST OUT OF GUN BARRELS BUY RUBBER CAMERA LENS CAPS TO PLACE OVER END OF GUN BARRELS. GOOD IDEA?
- OF COURSE "ROCKFORD" SCREWS ASSURE GOOD STRONG ASSEMBLY.

"Good Hunting"

HERM

Hobby-neering¹²

SERIES. NO. 9

PROJECT 9

USE FOR COMMERCIAL
PURPOSES
IS FORBIDDEN

Designed
by A.
AGER
OF
ROCKFORD

OF
ROCKEOR

★ HERE THERE AND EVERYWHERE with "ROCK"



Manufactured by:
**INTERNATIONAL BUSINESS
MACHINES CORPORATION**
112 EAST POST ROAD — WHITE PLAINS, NEW YORK

NEW NYGRAN

FILE-N-JOINT

Chain Saw Sharpener



Manufactured by:
NYGRAN INDUSTRIES, LTD.
RICHMOND, CALIFORNIA

th "ROCKFORD" Screws and Bolts ★



IBM
407 ACCOUNTING
MACHINE

W YORK



LTD.

★ **QUALITY CONTROLLED "ROCKFORD" PRODUCTS** ★



Steel and Non-Ferrous

**WOOD SCREWS
AND DRIVE SCREWS**

We invite you to send for our latest Catalogs and Price Lists. They contain a complete line of "ROCKFORD" Screws and Bolts for easy selection keyed to your threaded fastener needs.

DO YOU KNOW?

Many people are surprised to learn of the many different services Rockford Screw Products offers its customers. Service is our business, and it is our constant aim to help you with any or all fastener problems that may arise in your assemblies. Send us your ideas, blueprints or samples; perhaps we can make your parts better, faster, and cheaper by our advanced method of Cold Forging from wire.

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Use Postpaid Card, Circle No. 310

ROCKFORD SCREW PRODUCTS CO.



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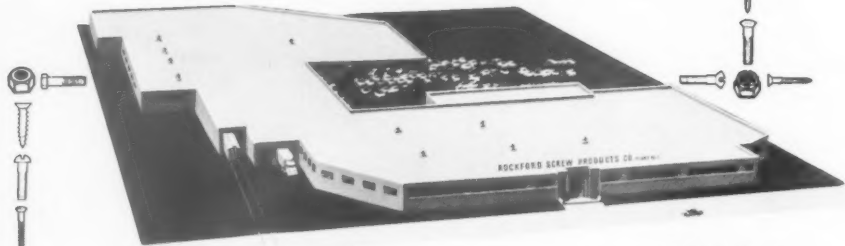
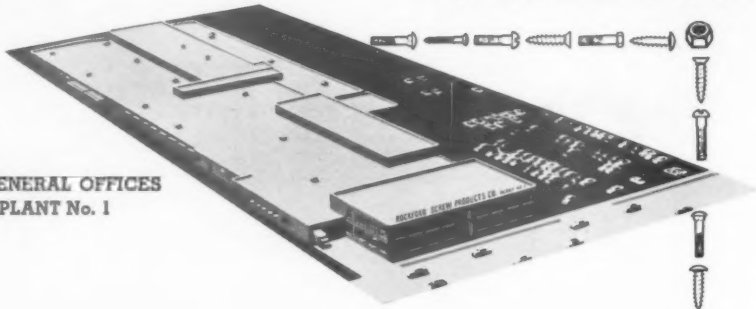
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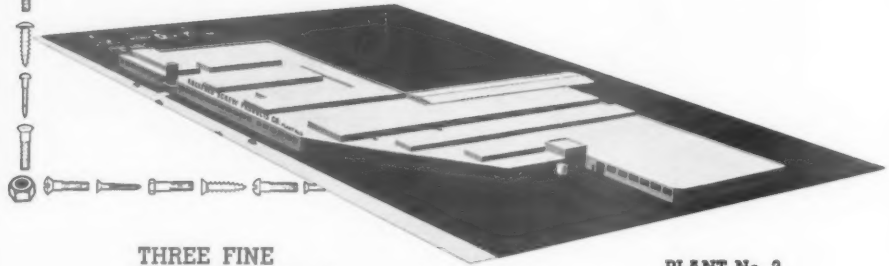
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GENERAL OFFICES
& PLANT No. 1



PLANT No. 2

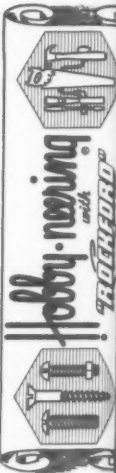


PLANT No. 3

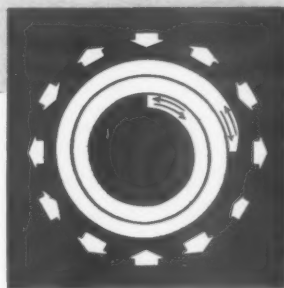
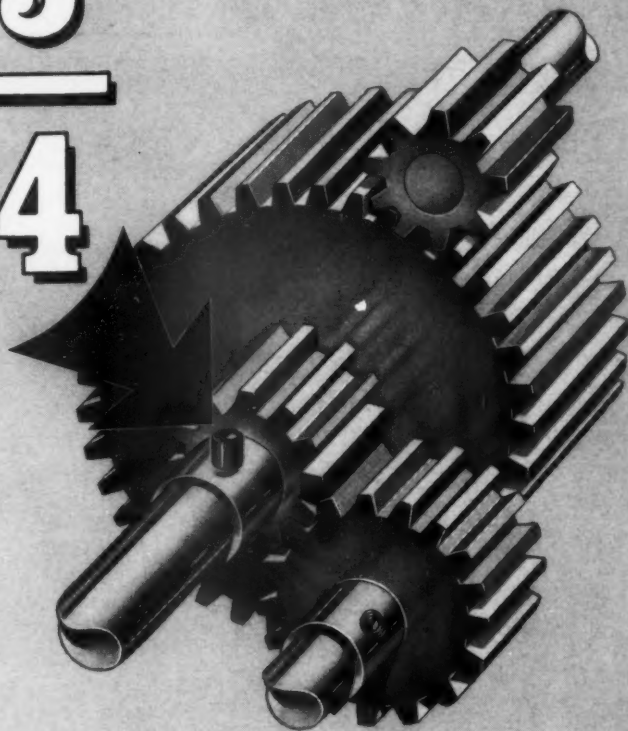
THREE FINE
MODERN PLANTS
PRODUCING "ROCKFORD" QUALITY CONTROLLED
THREADED FASTENERS FOR AMERICAN INDUSTRIES.

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ROCKFORD SCREW PRODUCTS CO.



$\frac{1}{32}$ to $\frac{3}{4}$
DIAMETERS



True spring coils give SPIROL pins extra strength in all sizes

Spiral coils make a true spring . . . give SPIROL pins full 360° radial tension when compressed in a hole . . . develop no critical stress concentration at any point. This spiral spring action increases pin strength . . . produces high shock-and-vibration resistance even in miniature sizes as small as $\frac{1}{32}$ " diameter. SPIROL pin's unique cross-section offers unequalled advantages in many applications: *Wider hole tolerances* — both plus and minus . . . *Non-heat-treated metals* — such as

low-cost brass, copper, nickel, stainless steel, where anti-corrosion or conductivity are desired . . . *Three duties* — heavy, medium, light . . . *Greater shock resistance* — permits use of "medium duty" pins in most applications . . . *Cost reduction* — results from wider tolerances, easier insertion, reusable pins, simplified product design and servicing. No other type of pin — solid or flexible — offers all the qualities and benefits you get with SPIROL, the true spring pin.

FREE! Write for complete literature on SPIROL spring pins, including price list.

SPIROL *the true spring* **PIN**



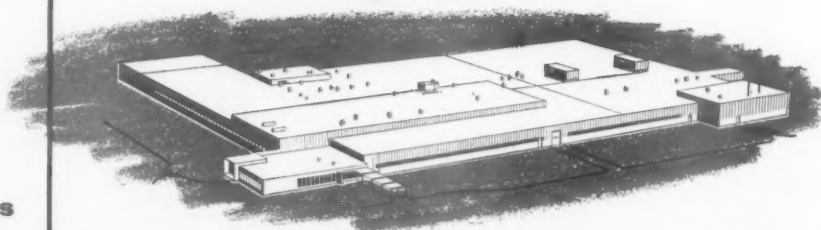
C. E. M. COMPANY • 141 SCHOOL STREET • DANIELSON, CONNECTICUT

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SERVING ALL INDUSTRY... FROM ROCKFORD, ILLINOIS



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ELCO TOOL AND SCREW CORPORATION 1101 Samuelson Rd., Rockford, Illinois

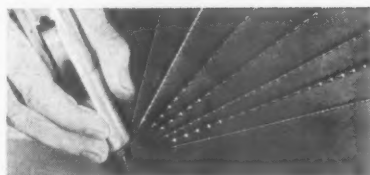
The top picture shows part of the huge cold-header department in our brand-new plant (sketch of which is just above). This carefully-planned factory, now going full blast, has 242,000 sq. ft. of floor space, is on a

35-acre tract south of Rockford, and is adjacent to the airport, a busy railroad, and the main highway. *You are cordially invited to visit us.* If possible we would like to hear from you in advance.

WHAT'S NEW IN EQUIPMENT

This month we review some of the interesting equipment listed during the past 12 issues. For further information on any item, circle the number matching the description on the card opposite page 68.

STICK OF SCREWS DRIVEN AUTOMATICALLY



(See 1)

Screwstick is a series of identical screws jointed together in stick form. Stick is inserted in pneumatic driver, and the entire stick of screws feeds automatically. Unit does not distort delicate parts, strip threads, or leave fastening tightness to guess work of man or driver.

Available in machine, thread forming and tapping screws, in diameters ranging from No. 0 to No. 6, and in lengths up to 5/16", they are easily removed with a simple hexagon wrench, and can be re-used. Driver torque can be adapted to any assembly requirement by varying the cross sectional area of the neck joining each screw. American Screw Co., Williamantic, Connecticut.

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ELECTRIC SOLENOID PUNCH WITH 3500 LB. IMPACT

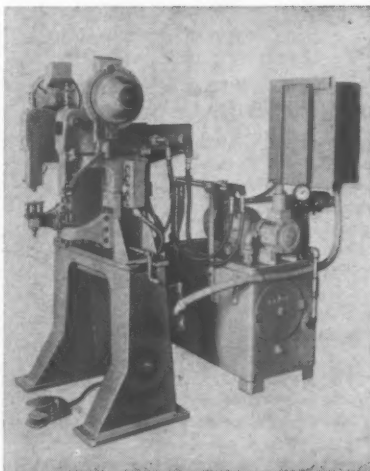


(See 3)

An electric solenoid punch stakes, rivets, marks, cuts off, bends, crimps with positive alignment. The machine has a 4 1/2" maximum vertical opening (2 3/4" minimum for tools and work), and 1 3/4" spindle travel, adjustable downward. The machine is hand or foot controlled, can be set up for single or dual and has a 3500 lb. impact. High Speed Hammer Co., 308 Norton St., Rochester 21, New York.

Use postpaid card. Circle No. 2

RETAINING RING TOOLS SPEED ASSEMBLY



(See 4)

Two retaining ring assembly tools have combined applicators and magazine-fed ring dispensers in one unit. The Truarc "Ring-Gun" and "Ring-Jector," (photograph) are particularly suitable for ring applications in which the work piece is too large to be brought to a fixed assembly station.

The Ring-Jector resembles a hand stapler. It is recommended for assemblies where clearance dimensions prohibit placing a tool over the work piece in an axial direction or where smaller rings are used which do not require substantial force for spreading to clear the shaft. Waldes-Kohinoor,

Inc., 47-16 Austel Pl., Long Island City 1, N.Y.

Use postpaid card. Circle No. 3

HYDRAULIC DUAL MACHINE SETS 1/4" RIVETS

A hydraulic dual riveter is tooled to set two 1/4" diameter solid steel rivets that are gravity fed from two 10" hoppers. The Model HDR Rivitor includes two riveting stands with 8" throat depth that are adjustable to spacing from 1 1/2" minimum to 18" maximum, center to center. Tomkins-Johnson Co., Jackson, Mich.

Use postpaid card Circle No. 4

ADJUSTABLE STUD DRIVER FOR TIGHT FIT JOBS

A stud driver designed for builders of aircraft engine and component parts drives studs where limited space demands a driver of small diameter. The driver can be adjusted for various lengths of grip on the stud without use of wrenches or tools. Where a spacer is used, projection heights are a matter of .002 or .003 variation. Titan Tool Co., Fairview (Erie County), Pa.

Use postpaid card. Circle No. 5

FORGED INSERT BITS FOR DRIVING PHILLIPS SCREWS

Forged Hy-Pro insert bits for driving Phillips screws are said to cost one-fourth as much as solid bits while giving double the service life of comparable bits. Bits are thrown away when worn out. Bit holders are also manufactured in types and sizes to fit all driving tools. Continental Screw Co., 448 Mt. Pleasant St., New Bedford, Massachusetts.

Use postpaid card. Circle No. 6

SCREWDRIVER-NUT RUNNER WITH PRE-SET TORQUE

Automatic starting of the air motor and automatic stopping when preset torque has been reached is the feature of a screwdriver-nut runner.

The Clecomatic motor operates only during actual rundown, using minimum air and subjecting the tool to less wear. The non-friction clutch has a "no-drift" adjustment. The non-reversible model



IOSA has a 950 rpm speed, the reversible IORSA a 700 rpm. Both have a 1/4" free running, No. 10 self-tapping screw capacity. Cleco Div., Reed Roller Bit Co., 5125 Clinton Dr., Houston 20, Tex.

Use postpaid card. Circle No. 7

DEVICE GAGES TENSILE STRENGTH OF FASTENERS



Quick, accurate checks of fastener tensile strength are possible with a hydraulic device which measures bolt tension by pressure created when the bolt or nut is tightened. Tension is read

directly in pounds on a specially calibrated pressure gage.

Assembly departments find the tester useful for calibrating power wrenches and for training assembly personnel to develop an accurate "feel" for proper torque. Skidmore-Wilhelm Mfg. Co., 442 Green Rd., Cleveland 21, Ohio.

Use postpaid card. Circle No. 8

REMOVABLE MAGNETS FOR SCREW DRIVING SOCKETS

A line of magnetic sockets used in driving self-tapping screws is now equipped with removable magnets. Worn-out sockets are simply replaced.

A special assembly tool inserts the magnet into a socket depth for proper magnetic contact with screw heads. Sockets and magnets are available in sizes from 1/4" to 9/16". Snap-on Tools Corp., 8033 28th Ave., Kenosha, Wis.

Use postpaid card. Circle No. 9



FRICTIONAL HOLDER FOR INSERT SCREW DRIVER BIT



A simple frictional device employing a new principle for holding all types of insert bits in bit holders operates by compressing a tiny neoprene ring to firmly hold all types of insert bits frictionally.

The patented device is standard on all Magna-Tip magnetic bit holders for 1/4" and 5/16" hexagon insert bits for all

types of recessed head screws. Magna Driver Corp., 779 Washington St., Buffalo 3, New York.

Use postpaid card. Circle No. 10

PNEUMATIC RIVETER WITH BLADE HOPPER ATTACHMENT

The Model 56-FH riveter embodies a narrow cross-sectional area of machine front, allowing for single or multi-spindle arrangement. Attachment of blade hopper permits straight "in-line" feed of difficult-to-feed parts such as long tubular rivets, collar studs and threaded or knurled parts.



Tubular rivet diameters can be handled to 1/8". Larger diameter shanks can be handled if the part is only to be inserted or loosely clinched. Milford Rivet & Machine Co., Milford, Conn.

Use postpaid card. Circle No. 11

TWO TO EIGHT-TON ASSEMBLY PRESS LINE

A line of "E" series multipresses features a self-contained unit of "C" frame design. This series of two to eight-ton capacity presses employs the factor that lower pressures properly applied on a given application often produce better quality products than a misapplied higher pressure. This is particularly suitable for assembly, crimping, forming, broaching, trimming.



Ram force ranges from 400 to 16,000 lbs., depending on the model. It is designed for manual or automatic production. Denison Engineering Division American Brake Shoe Co., Columbus 16, Ohio.

Use postpaid card. Circle No. 12

SETTER FEEDS AND STAKES 100 TERMINALS A MINUTE

Designed to feed and set up to 100 standard turret or seamed terminals per minute is the all-electric, automatic terminal setter, Model FST.



Terminals are oriented and fed to a staking nest from a vibratory feeder. Operator places board over terminal and actuates machine with a foot switch staking terminal in board. Power-feed

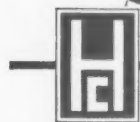
C=An+N, (Hy)
P

Looks complicated, doesn't it? Yet this is the formula one of our customers uses to figure tool costs! AND IT PAYS!



If you would like information on this formula and additional facts on ways it may be applied to reduce and control costs—then drop us a line and we will send you a Booklet without any obligations that will give you some ideas!

Our business is tooling for the Fastener Industry and our one objective is to make better tools to lower your costs.



Established 1940

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Tool Makers to the Fastener Industry
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BIRMINGHAM
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Birmingham, Alabama
WORTH 1-6193

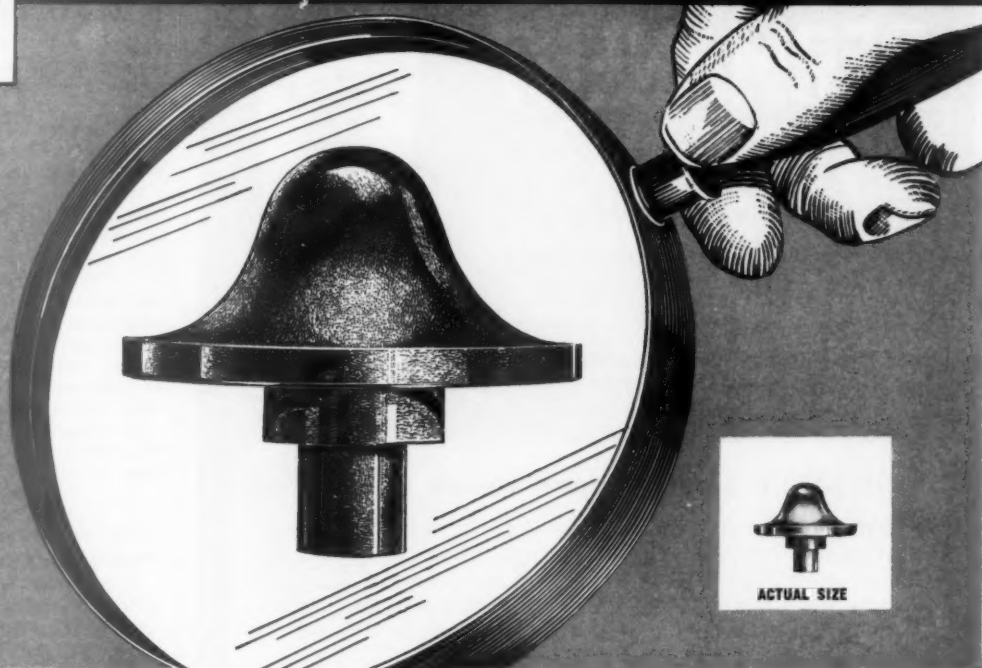
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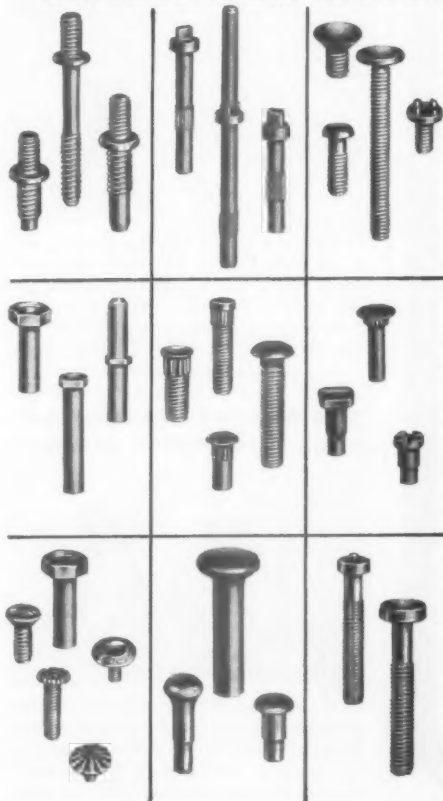
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COLD-HEADING does it again!



**IF YOU USE PARTS LIKE THESE,
COLD-HEADING MAY SAVE YOU MONEY**



Screw-machining this click button wasted almost 50% of brass bar stock. Hubbell cold-heading improved quality, speeded production, and cut cost 36%

36% SAVING on BRASS CLICK BUTTONS

Redesigned for cold-heading, this brass click button now costs 36% less than when it was screw-machined from bar stock with almost 50% waste of material.

Also important in reducing its cost is the high-speed production that cold-heading makes possible: 60 buttons per minute vs. 5.5 with screw machines.

But that's not all! The cold-headed buttons are stronger, more accurately dimensioned, and more uniform in quality and finish.

SEND FOR FREE ANALYSIS AND ESTIMATE!



If your operation uses large quantities of small metal parts formed on automatic screw machines, equal or greater savings may be possible by having Hubbell produce them by cold-heading.

It will cost you nothing to find out!

Simply mail the part or the blueprint, and we will have it analyzed by our staff of cold-heading specialists. If savings or product-improvements are possible, we'll give you the facts and figures. In any event, there's no obligation on your part.

HARVEY HUBBELL, INCORPORATED

MACHINE SCREW DEPT., BRIDGEPORT 2, CONNECTICUT

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3 WAYS TO PERMANENT THREADS - IN ANY MATERIAL!

... For original design — or thread repair — choose from this full line of **Heli-Coil®** Inserts ... the original and only stainless steel wire thread insert.



HELI-COIL Screw-Thread Insert

Permanently protects threads against wear, stripping, corrosion, galling, seizing, vibration and shock. Made of 18-8 stainless steel wire, cold-rolled into a diamond-shaped cross section, this **Heli-Coil** Insert is work-hardened to a tensile strength of approximately 200,000 psi. Conforms to military standards and all commercial and industrial thread forms.



HELI-COIL Screw-Lock Insert*

This one-piece wire Screw-Lock Insert provides all the thread protection of the Screw-Thread Insert, PLUS an exclusive resilient *internal* locking feature that eliminates clumsy protruding lock nuts, lock wiring and other supplementary locking devices. It saves cost, space and weight — permits simple streamlined design in standard bosses. Meets military and N.A.S. specifications for locking torque and vibration.



HELI-COIL Shop Pack

Contains everything needed for fast, easy thread repair — *on the spot!* Salvage expensive parts — for pennies! Shop Pack restores threads to original size. Available in U.N.F. and U.N.C. sizes 6-32 to 1½-6. There's a kit for spark plug and pipe thread sizes, too. Each Shop Pack contains a supply of **Heli-Coil** Screw-Thread Inserts with special tap plus inserting tool.

There is a *complete* line of **Heli-Coil** products for every thread need: inserts, taps, tools and gages. Let us help with your design and application problems. Write today for complete information.

*Patented



HELI-COIL CORPORATION

3110 Shelter Rock Lane, Danbury, Connecticut

1923

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advances each terminal to the nest. Black & Webster Inc., 445 Watertown St., Newton, Mass.

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PLIERS DOUBLE AS VISE IN SMALL PARTS PLACING

A hand tool is designed for grasping and positioning small objects. The 5" long Lock-GriPlier features a locking arrangement that permits its jaws to achieve a firm grip on small washers, brads, screws, wires and other parts. The new tool can be used as a vise while performing operations where both hands must be kept free.



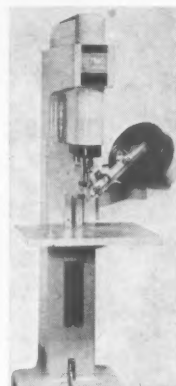
The case-hardened steel jaws of the tool are specially notched for cutting wire and stripping insulation. Handicraft Tools, Inc., Division of X-acto, Inc., 48-41 Van Dam St., Long Island City 1, N.Y.

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SCREWDRIVER CLUTCH PERMITS EVEN TORQUE

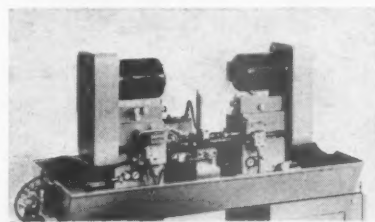
A magazine-fed power screwdriver is available either as a floor model or as a self-contained driving head for use in automatic assembly machines incorporating straightline transfers.

The Model U has a driving range of from No. 6 x 3/16" long to No. ¼ x 1½" long screws. The clutch permits constant torque. It is adjustable from a minimum of 15 inch lbs. to 120 inch lbs., holding a tolerance of plus or minus 2 inch lbs. at the lower range to plus or minus 6 inch lbs. Detroit Power Screwdriver Co., 2809 W. Fort St., Detroit, Mich.



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TWO-SPINDLE HORIZONTAL DRILLING-TAPPING MACHINE



A two-spindle horizontal opposed drilling and tapping machine's capacity includes .020" to ¾" drilling and up to ¾" tapping in mild steel. Spindle stroke up to 2½" possible. Designed for magazine or hopper feeding. Each automatic

drilling unit synchronizes for either simultaneous or alternate spindle movement up to 500 cycles per minute. Depth control of .0005" obtainable. Universal-Automatic Corp., 9545 Ainslee St., Schiller Park, Illinois.

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SMALL RATCHET WRENCH FOR CLOSE-CLEARANCE JOBS



A small ratchet wrench is designed for close-clearance wrenching operations. The outside diameter of the wrench head does not exceed the diameter of the head flange on a twelve point screw which means there is no overlap to interfere when bolting or nutting in tight places. A tool of the same type is available for hex-head bolts and nuts. The tool can be used for either tightening or loosening. Milbar Corp., 1900 Euclid Ave., Cleveland 15, Ohio.

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DRIVER'S TORQUE CLUTCH ACCURATE WITHIN 5%

A cage-controlled roller clutch is the outstanding feature of the Auto-Torque Driver. The clutch is accurate within 5% of torque setting, and causes no impact when "torquing out." It has two ranges—5 to 84 and 48 to 120 inch-ounces.



The driver handles screws and nuts from No. 4 screw to 5/16" diameter. Minimum cycle time is .6 seconds, depending on threaded distance. Dixon Automatic Tool, Inc., 2300 23rd Ave., Rockford, Ill.

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WORK HOLDER SUPPORTS UP TO 15 LBS. AT 6-INCHES

Combining a light duty vise and work positioner has produced the Veep Pow-Ram work holder for use on conveyors, benches, pallets. The movable vise jaw travels on close tolerance gibs and the positioner has a work weight capacity of up to 15 lbs. at 6". Maximum jaw opening is 2 1/4", jaw depth, 1 1/8" and width, 2 1/4".



The positioner can be adjusted to any position in all three planes and

It Costs No More to Be Sure with **NON-LINK POSITIVE LOCK WASHERS**



NOW Same Price As "Regulars"

THE original NON-LINK POSITIVE lock washers have long been known as the one sure way to keep bolts and nuts tight. Now you can get these superior NON-LINK POSITIVE Lock Washers in the 9 Most Popular Sizes AT NO EXTRA COST... at the SAME PRICE as regular spring lock washers!

SCREW AND BOLT SIZES (A.S.A. Medium Section)

3/16", 1/4", 5/16", 3/8", 7/16"
1/2", 9/16", 5/8", 3/4"

The "Barbs" Make the Difference!

The "barbs" or "teeth" are the feature which makes NON-LINK POSITIVE Lock Washers superior to conventional spring lock washers. In all other respects they conform to A.S.A. standards; they are non-linking, and interchangeable with regular lock washers of like size and section.

Write for FREE Trial Order!

If you write us on your company letterhead, or use your company Purchase Order, we will send you free a small quantity of NON-LINK POSITIVE Lock Washers in any or all of the 9 Popular Sizes listed above. (A.S.A. Medium Section).

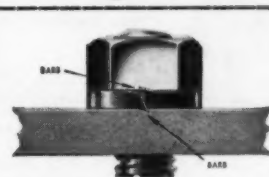
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POSITIVE LOCK WASHER CO.

187 Miller St., Newark 5, N.J.

Manufacturers of High Grade Lock Washers Since 1890

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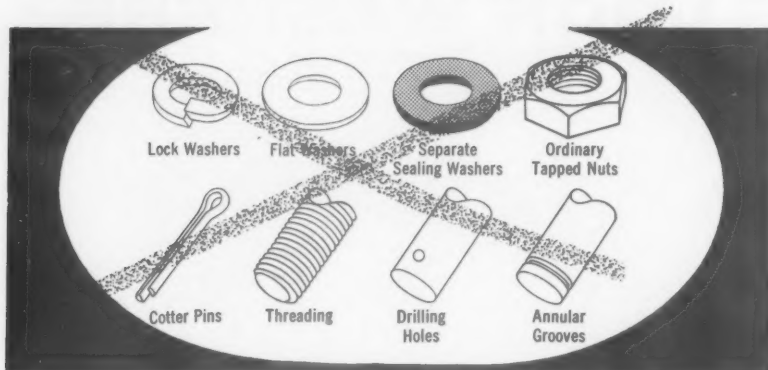
Be SURE with POSITIVE

Illustration shows how NON-LINK POSITIVE Lock Washers work — how they combine the advantages of tooth-type washers with the proved spring-power of regular lock washers. Arrows point to the tooth or "barbs" imbedded in both the nut and bearing surface. Combined with the spring-power of the washer itself, this feature makes sure that bolted assemblies are permanently tight.

PALNUT® LOCK NUTS and FASTENERS

Eliminate

one or more of these assembly parts or operations



- and provide compact, vibration-proof assemblies

PALNUT Lock Nuts for Threaded members



Spring tempered steel Palnuts, with the dependable double-locking thread form, are available in many stock types and sizes to meet practically any assembly need. Here are typical advantages:

- **Low cost**—less than other locking devices, often less than plain nuts.
- **Easy, fast assembly** with ordinary manual or power tools, extra fast with Palnut Magnetic Wrenches.
- **Save Parts.** One Palnut replaces 2, 3, even 4 parts according to application.
- **Save Space** by eliminating auxiliary parts.
- **Save Weight**—up to 85% reductions in fastener weight.
- **May be removed and re-used.**



FASTENERS for Unthreaded Studs, Rods, Pins, etc.



SELF-THREADING NUTS

Save threading costs. Form their own deep, clean threads while tightening on studs of any malleable material, including aluminum or zinc die-cast; also rods, shafts, wire or pins of steel, aluminum, brass or plastic. Fast assembly with standard tools. Vibration-proof grip, whether seated or unseated. Remove and reuse on same studs. Sizes for $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{1}{2}$ " dia. Write for Bulletin 585-A.

PUSHNUT® FASTENERS

Simply push on unthreaded studs, rod, wire or rivets. Strong spring grip resists removal. Save threading, grooving, drilling for cotter pins. Low in cost, fast assembly. Many types and sizes.



Write for Catalog 573-C and Free Samples, stating type, size and application.

THE PALNUT COMPANY, 79 Glen Road, Mountainside, N.J.
In Canada: P. L. Robertson Co., Ltd., Milton, Ont.

PALNUT®

LOCK NUTS FASTENERS



Quick, secure fastening at low cost

Use postpaid card. Circle No. 240

locked in place instantly. Wilton Tool Mfg. Co., Inc., Schiller Park, Illinois. Use postpaid card. Circle No. 19

LINE CLAMP PLIERS SPEED ASSEMBLY

A line clamp pliers engineered for use in cramped quarters is claimed to speed single or multiple line clamp assembly. Model No. 82 simultaneously holds the clamp bolt, compresses the line clamp(s) and automatically holds them in closed position, leaving both hands free to apply the clamp nut or additional clamps. B. K. Sweeney Mfg. Co., Denver 16, Colorado.



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SCREWDRIVER TORQUES IN TENTHS OF INCH OUNCES

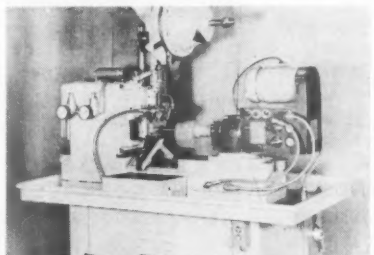
A precision torque screwdriver for delicate assembly work measures from 0 to 3 tenths of an inch-ounce torque, or can be made to read from 0 to 6, 8 or 10 tenths of an inch-ounce torque. It is designed for No. 0 to No. 2-56 screws, but can be made to fit screw sizes ranging from No. 0 to No. 4 by changing the blade.

The tool measures $\frac{4}{32}$ " long. A mechanical stop prevents damage from over-torquing. The screwdriver is calibrated by gram weights. Apco Mossberg Co., 1001 Lamb St., Attleboro, Mass.



Use postpaid card. Circle No. 21

HOPPER FED DRILLING, TAPPING MACHINE



A fully-automatic hopper-fed drilling or tapping machine positions and holds rivets or other similar headed parts for secondary operations.

The Beco 409 clamps the heads of the work axially, eliminating distortion which would cause the tool to weld to the workpiece. Other features are: fast operation, the absence of cams for spindle advance, and the ability to either drill or tap, tapping to within $\frac{1}{16}$ " of the bottom of blind holes. Batchelder Engineering Co., 125 Main St., Springfield, Vt.

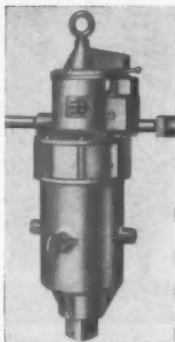
Use postpaid card. Circle No. 22

GIANT AIR TOOL FOR HEAVY-DUTY NUT RUNNING

A pneumatic tool for tightening and removing nuts on bolts from 6" to 12" diameter is handled by a hoist or crane. It positions with eye-bolt suspension for either vertical or horizontal use.

Impactool 599, the largest in a 27-tool line, is equipped for two-man operation, has a reversible motor and a ball and cam impact mechanism. It delivers 500 blows per minute when impacting, weighs 599 pounds and is available with heavy duty impact type sockets and a 3½" square socket driver. Ingersoll-Rand Co., 11 Broadway, N.Y. 4, N.Y.

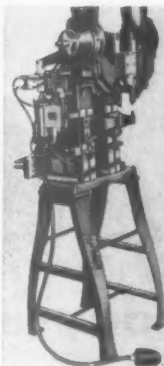
Use postpaid card. Circle No. 23



PNEUMATIC RIVET SETTERS FOR AUTOMATIC OPERATION

Fragile materials such as ceramics and plastics are said to be riveted with a minimum of breakage with pneumatic rivet setters. The new line includes single and multiple setters as well as machines for integration into automated operations. Air line pressure requirements are 50 to 60 lbs. Controls are electric. Cushioned operation also makes the machines suitable for fastening assemblies of uneven thicknesses. Chicago Rivet & Machine Co., 950 South 25th Ave., Bellwood, Illinois.

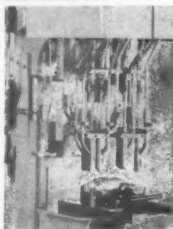
Use postpaid card. Circle No. 24



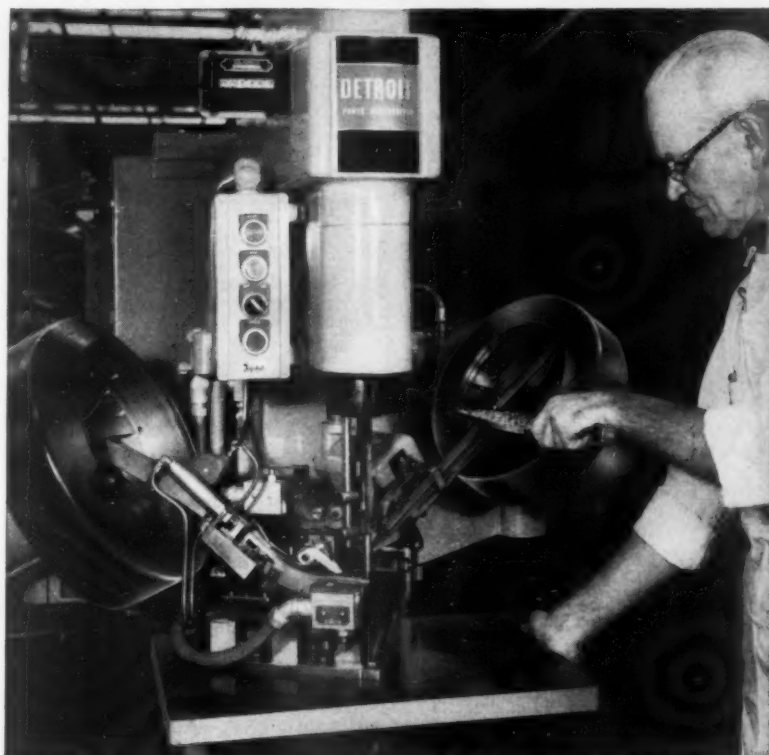
MULTIPLE SPINDLE SCREWDRIVER MACHINE

A hopper-fed multiple spindle screw-driving machine simultaneously selects up to 10 machine screws, of two different lengths, feeds, and drives the fasteners to desired torque. The high-production machine can also be adapted to other applications having different screw patterns by installing the correct spindle and chuck locating blocks. A simple sliding fixture is used to position the work pieces. Cook & Chick Co., 2415 W. 24th St., Chicago 8, Ill.

Use postpaid card. Circle No. 28



19,000 ASSEMBLIES...



all in a day's work for **DPS** special assembly machines

True to its name, Automatic Electric Company has made this small parts assembly *fully automatic* with a DPS assembly machine. A subsidiary of General Telephone & Electronics, Northlake, Ill. the company has realized increased capacity with fewer rejects on telephone terminal assemblies. This type machine in similar assembly operations has paid for itself in less than a year from savings over previous method.

If you have a small parts assembly problem, talk it through with Detroit Power Screwdriver Company. Industry's most advanced design screwdriving machine is the result of more than three decades of specialization. Add to this a complete line of parts feeders (vibratory, rotary and elevating) and you're assured an operation that is automatic and effortless. Write today for full information.

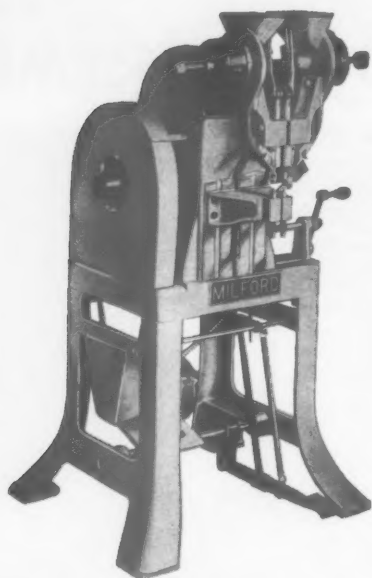


DETROIT POWER SCREWDRIVER COMPANY

2815 W. Fort St. • Detroit 16, Michigan

A Subsidiary of Link-Belt Company

Use postpaid card. Circle No. 241



High strength and uniform quality are extremely important when tubular rivets are used in automatic assembly. Trouble-free operation is the only way to be sure of the cost savings resulting from mass production and automatic fastening.

To cut delivery time and production costs . . . to improve product appearance and strength . . . to assemble your product on automatic rivet-setting machines—*get in touch with Milford first!*

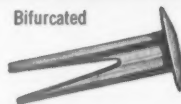
Semi-tubular



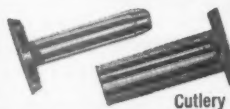
Full-tubular



Bifurcated



Cutlery



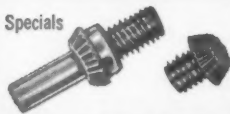
Decorative



AUTOMATIC ASSEMBLY IS FAST, ECONOMICAL AND TROUBLE - FREE WITH MILFORD TUBULAR RIVETS

To give you unmatched delivery service on tubular rivets, Milford has five *manufacturing* plants and twenty sales offices strategically located across the country's industrial beltline.

Specials



Specials



MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNSYLVANIA • ELYRIA, OHIO • AURORA, ILLINOIS • NORWALK, CALIF.

WHAT'S NEW IN FASTENING AND JOINING

Fastening and joining products reviewed during the past year are being repeated for your interest. Use the card opposite page 68 for additional information.



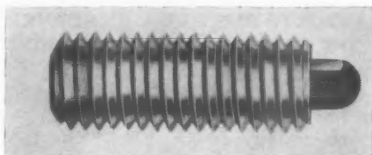
(See 26)

SILVER BRAZING WASHERS FLAT WIRE EDGEWOUND

Non-tangling coil form washers are edgewound from flat wire to eliminate scrap losses. The washers are suitable for use with induction, gas-air, furnace heating methods and accurate metering of alloy and leak tightness are assured. Available in Easy Flo and Silfos as well as copper, bronze and alloys.

Flat wire alloy is wound on edge and then cut partially through. The coil of washers is shipped intact and each washer is snapped from the coil and preplaced on work as needed. Lucas-Milhaupt Engineering Co., Cudahy, Wis.

Use postpaid card. Circle No. 26



(See 32)

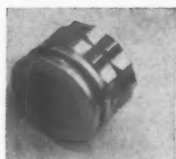
HEX NUT PREASSEMBLED WITH SPRING LOCK WASHER

A standard hex nut preassembled with a spring lock washer utilizes the locking principle of the cupped spring washer. The Tenz-Nut provides reactive spring pressure to help compensate spring looseness which may develop in a bolted assembly. The nut applies "choking" action on the bolt threads. Reliance Div., Eaton Mfg. Co., Massillon, Ohio.

Use postpaid card. Circle No. 27



(See 27)

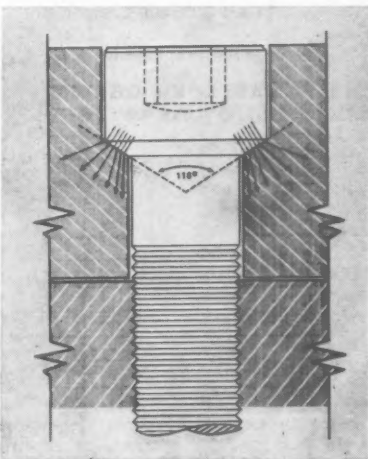


(See 31)

VARIED LOCK WASHER LINE

The Tangle-proof lock washer line is available in high carbon steel, stainless steels, silicon and phosphor bronze. Plating to order. Hoblock Hammer-Lock and Loxit Extended Prong cotter pins are also available. Hobbs Mfg. Co., Worcester, Mass.

Use postpaid card. Circle No. 28



(See 29)

SOCKET SCREWS FEATURE IMPROVED BEARING DESIGN

A 28% improvement in working efficiency has been claimed for a line of socket head cap screws which incorporate a taper rather than a straight flange in the head design.

The screws provide 16% more bearing surface without an increase in head size. There is 14% less resultant compression because of the change in di-

rection of stresses. Indenting or corner fatigue is eliminated. And the taper creates a greater locking effect requiring 12 to 23% more torque to release.

The fasteners are self-aligning and seal against leakage of oils, liquids and gases. Mac-it Parts Company, Lancaster, Pa.

Use postpaid card. Circle No. 29

TAPPING STUDS FOR FIELD ERECTED SANDWICH WALLS

Tapping studs for constructing field-erected sandwich walls enable one to handle the complete erection job on curtain walls as the sheeting progresses. The two-piece fastener has a hex collar at the base of the stud which makes for easy and straight driving.

Since the inner sheet is put in place and attached, instead of being impaled over previously installed studs, flat as well as corrugated sections are practical. Townsend Co., Box 237-Z, Ellwood City, Pennsylvania.

Use postpaid card. Circle No. 30

VIBRATION-RESISTANT, HIGH-TEMP. LOCKNUT

A seating type all metal, free running self energized reusable lock nut will withstand up to 1600° without thread seizure.

A grooved washer at the bottom of the nut is pressed over the threaded section suspended from the main body of the nut. After torque has been applied, the washer compresses to cause the threaded section to move in and lock radially and axially on the bolt. Klincher Locknut Corp., 2153 Hillside Ave., Indianapolis, Ind.

Use postpaid card. Circle No. 31

HEX NOSE SPRING PLUNGERS SPEED FIXTURE LOADING

Hex nose spring plungers feature large bearing surfaces which overcome binding and are said to assure perfect alignment of the plunger at any extension. Installed with a standard end or socket wrench, the plunger's concentricity between axis and body

diameter is held to .0015" T.I.R. Loading and unloading of jigs and fixtures is speeded by radiused nose. Vlier Engineering Corp., 8900 Santa Monica Blvd., Los Angeles 46, Calif.

Use postpaid card. Circle No. 32

ONE-PIECE HOSE CLAMP FOR QUICK APPLICATION

A one-piece hose clamp for low pressure hose and tubing, clamps permanently with only one squeeze of a simple tool.

Squeezing the clamp's locking lug tight with pliers or pneumatic tool decreases the inside diameter of the clamp so that it firmly binds the hose to its fitting. The clamp metal takes a permanent "set" in place and cannot work loose. Cuyahoga, Products Corp., 10252 Berea Rd., Cleveland, Ohio.

Use postpaid card. Circle No. 33



SELF-LOCKING METAL SCREW FOR 1200°F APPLICATIONS

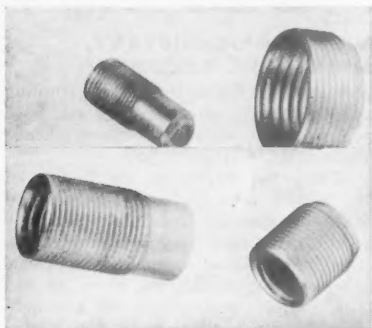
A self-locking screw is designed for applications at temperatures up to 1200°F.

Made with an all-metal rolled tubular insert, torque action compresses the screw's insert. The resiliency of the metallic tube causes a re-forming action on the part of the insert, producing a locking effect on the screw. Long-Lok Corp., 2601 Colorado Ave., Santa Monica, Calif.

Use postpaid card. Circle No. 34



THREADED INSERTS FOR SOFT METALS, PLASTICS



A line of self-locking inserts molding metal-to-metal is designed for repairing damaged threads, protecting internal threads in soft metals and plastics and for strengthening assemblies and light castings.

Min. O. Dee (minimum outside diameter) incorporates a 6° tapered root to reform the softer receiving thread to its own contour. Lock Thread Corp., 2832 E. Grand Blvd., Detroit 11, Mich.

Use postpaid card. Circle No. 35

MINIATURE SCREW RESISTS VIBRATION, FLUIDS



A subminiature screw with a groove underneath the head to accommodate a silicone rubber O-ring has a 2-56 NC thread and a slotted head (APM Type "S").

Sealscrew's O-ring is compressed when installed to form a vibration-resistant seal. It is unaffected by fluids and is reusable. Automatic & Precision Mfg. Corp., 252 Hawthorne Ave., Yonkers, N.Y.

Use postpaid card. Circle No. 36

MINIATURE BRASS SCREW .021" IN DIAMETER

A still smaller screw has been added to a line of miniature fasteners. The size is 0000-160 with a body diameter of .021" and is available in brass with flat and oval fillister heads in 1/16", 3/32" and 1/8" lengths. J. I. Morris Co., Southbridge, Mass.

Use postpaid card. Circle No. 37



HIGH TENSION SPRING CLAMP WITH 65 LB. GRIP

A spring clamp for holding edges of two or more thicknesses of wood, metal, plastic, fiberglass and other workable materials, has a grip capacity of 65 lbs. The Edgeloock jaw opening is 1", weight is approximately 1 oz., over-all length is 2 1/4". The spring is completely enclosed for protection to the operator as well as to the clamp itself. The clamp is set and released with clamp-setting steel pliers. Wedglock Corp., 5446 Satsuma St., North Hollywood, Calif.

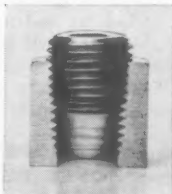
Use postpaid card. Circle No. 38



HEX SOCKET PRESSURE PLUGS ARE FLUSH SEATING

The Unbrako LevL-Seal also has a different taper from that of the tapped hole—providing leak-proof seal without compound.

Secret of the hex socket pressure plug is in the interference fit resulting from a deliberate interference in taper between the plug and tapped hole. This permits much closer control over point of seating of the plug. Designed for use in standard 3/4" per-foot taper tapped holes, the plug has a carefully controlled taper of



7/8" per foot. Standard Pressed Steel Co., Jenkintown, Pennsylvania.

Use postpaid card. Circle No. 39

PRESS TERMINAL FEATURES FUSED GLASS INSULATION



A press terminal features green-glass insulation which is unaffected by moisture, acids, alkalis or fungus.

The green glass, fused at high temperatures, offers resistance to twist-out or pull-out of the contact. The terminal comes in nine contact styles, including standoff and feedthru, in three basic body sizes. Flashover ratings are up to 3000 volts with contact ratings to 10 amperes. The installation consists of punching or drilling one hole and pressing the part in place. Rosan Inc., Dept. 40, 2901 West Coast Hwy., Newport Beach, Calif.

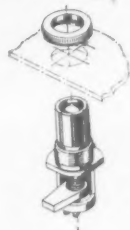
Use postpaid card. Circle No. 40

ADJUSTABLE PAWL FASTENER FOR PANELS, DOORS, FRAMES

An adjustable pawl fastener eliminates the parts usually required to hold the fastener body to door or panel. One 9/16" diameter hole takes the fastener shaft, another .082" diameter hole receives a stop pin on the fastener to prevent it from rotating.

No. 48 fastener automatically adjusts its pawl position to accommodate variations in frame thickness up to 1/4". Southco Division, South Chester Corp., Lester, Pa.

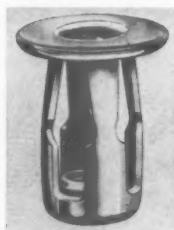
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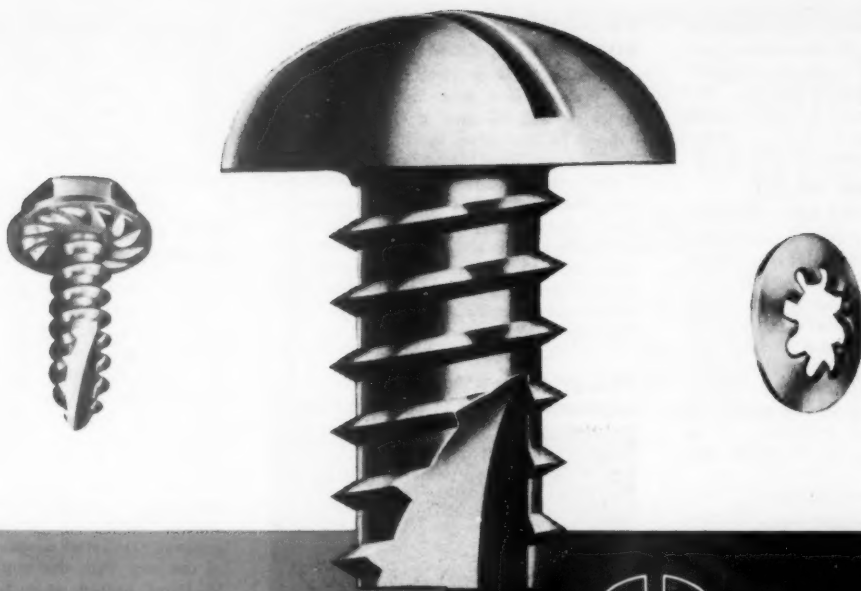


BLIND FASTENER GRIPS MATERIAL 0" TO 3/8" GRIPS

A blind fastener with threads which grip any kind of material from 0" to 3/8" thick is self-adjusting to grip evenly on rough, curved smooth surfaces.

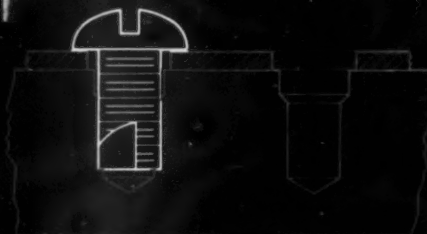
The nuts can be used as rivets and/or blind fasteners in expansion space. They provide nutplates for attachment screws. Anchorage is permanent, permitting





**HOW TO SELECT
COST-SAVING**

fasteners for plastic



A TYPICAL EXAMPLE:
Cuts its own thread—

Shakeproof's® Type 25 Thread-cutting Screw saves time because it eliminates tapping. Blunt point assures maximum thread engagement and high holding strength when driven into a relatively thin panel.

Shakeproof has pioneered in developing ingenious, cost-cutting fasteners for plastic applications. The screw featured above not only taps its own hole—often it eliminates costly threaded inserts. Another Shakeproof development, the Type 17 self-drilling NibscREW®, both drills and taps as it is driven. A Shakeproof Dished Lock Washer compensates for differential in expansion between plastic and metal . . . temperature changes won't loosen the assembly.

For highest quality fasteners that assure faster assembly and lower costs investigate the Shakeproof line. There's a Shakeproof fastener to meet your need—or Shakeproof engineers will develop one for your specific application.

WRITE FOR NEW SHAKEPROOF BULLETIN NO. 300 Shakeproof Bulletin 300 shows ten typical, profitable applications of Shakeproof fasteners on products using plastics. Offers free samples for testing. Send for your copy now.



SHAKEPROOF
"FASTENING HEADQUARTERS"®
DIVISION OF ILLINOIS TOOL WORKS

St. Charles Road, Elgin, Illinois
In Canada: Shakeproof/Fastex

Division of Canada Illinois Tools Limited, 67 Scarsdale Road, Don Mills, Ontario

Use postpaid card. Circ'e No. 243

screws to be removed and replaced. Jack Nuts made a vibration-proof assembly with weight-carrying capacity limited in most cases only by the strength of the material in which used. Molly Corp., Reading Pa.

Use postpaid card. Circle No. 42

SILVER-CADMIUM OXIDE ELECTRICAL CONTACT RIVET

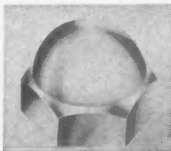
Electrical contact rivets, cold-headed directly from sintered silver-cadmium oxide wire will be known as 710 contacts. Sintered silver-cadmium oxide is considered an outstanding contact material for use in heavy duty applications where high electrical conductivity, high resistance to sticking and welding, and good resistance to arc erosion are all required. J. L. Thomson Mfg. Co., 122 Sawyer Rd., Waltham 54, Mass.

Use postpaid card. Circle No. 43

CAP NUTS INTRODUCED TO FASTENER LINE

Cold headed cap nuts have been added to a fastener line. Produced on highly automated equipment, the cap nuts are available in steel, brass and aluminum. Sizes: No. 4 through 1/2". Samples. Jacobson Nut Mfg. Corp., Box 177, Kenilworth, N.J.

Use postpaid card. Circle No. 44



SULPHUR COPPER ALLOY FOR PARTS, COMPONENTS

An alloy has a machinability rating of 90, electrical and thermal conductivity of 96% of that of OFHC or ETP copper as compared to 90% for Tellurium copper. It is available in rods only.

For common fabricating processes the alloy has a hot working temperature of 1400-1600° F, annealing temperature of 750-1200° F and shows cold working characteristics comparable to pure copper. It is more ductile than Tellurium copper. Scovill Mfg. Co., Waterbury 20, Conn.

Use postpaid card. Circle No. 45

PLASTIC PARTS RESIST DEFORMATION UNDER STRESS



Production of injection molded tiny plastic parts of Delrin acetal resin is being done in five part-designs.

One of the advantages offered by Delrin is excellent overall "creep" resistance. This was emphasized in a test where the acetal resin, under prolonged loading at 90% relative humidity and 150° F, exhibited less than half as much

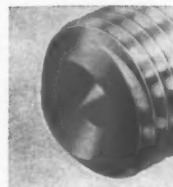
creep as all other thermoplastics tested. This quality, plus high strength and stiffness, low permeability and resistance to solvents and corrosion is claimed to enable predictable performance and economies in calculating safety factors. Gries Reproducer Corp., New Rochelle, N.Y.

Use postpaid card. Circle No. 46

SET SCREW CONE POINT CENTERED IN CUP EDGE

A socket set screw is constructed so that its cone point makes contact with the engaged work before the cup edge, which is also an integral part of the fastener. It is claimed to track evenly and with a well-defined even groove, resulting in positive frictional contact of both flanks of the cup with the engaged work. The W-Point acting as a fixed point, will prevent oscillation of the cup edge and minimize the tipping effect of key tightening. Parker-Kalon Div., Clifton, New Jersey.

Use postpaid card. Circle No. 47



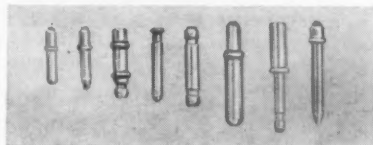
LIGHTWEIGHT LOCKNUT WITH "MINIMIZED HEX"

A line of high strength self-locking nuts is claimed to be 40% lighter than current NAS types. The "minimized hex" body section of the Type LH3324 nut is fortified with a base ring for thread load distribution, and to provide bearing area for use with soft metals. The locknut offers wrenching dimensions two socket sizes smaller than equivalent NAS or AN nuts. The fastener is provided for temperatures up to 900° F and is made of A286 corrosion resistant steel. Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.

Use postpaid card. Circle No. 48



PINS, TUBULAR PARTS BY AUTOMATIC SWAGING



Pins and small tubular parts may be beaded, grooved, headed or shouldered to meet any practical requirement. Swaged pins can be hollow throughout their entire length, making a passageway for lead wires and other parts. Most standard pins may be furnished pre-slit to provide an even, four point overlay. Auto-Swage Products, Inc., Wooster St., Shelton, Conn.

Use postpaid card. Circle No. 49

Close Tolerance Bolts
Nuts • Screws
Washers • Pins
Studs • Grommets
Clamps • Rivets
Electronic Parts
Aviation Lamps
Fittings

All sizes & types

All metals
Stainless & Nylon
Our specialty



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service**

AN • MS • NAS
aircraft fasteners & parts

Emergency and
short runs a
specialty

No quantity
too small
One or 1 million

No tolerance
too close
to handle

No waiting 6 to 8 weeks, we do it in less than 1 week . . . because our stocks, our equipment and our staff are specialized. We make the purchasing agent's and the engineering department's job easier. Your assurance: quality, dependability and service!

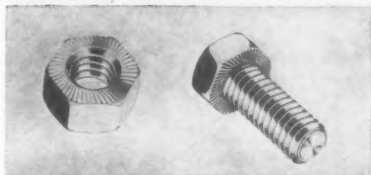
**Send for our catalog RIGHT NOW or
let us quote on your requirements.**

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476 U. S. Highway 46 • Hackensack, N. J.
Phone: HUBbard 7-3886

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NUT HAS HIGH BOLT TENSION FOR GIVEN TORQUE



A lock nut is said to supply a high bolt tension for given torque and a high release torque compared to application torque.

Whiz-Lock is described as a reusable, one-piece, free-spinning lock nut. Bearing type with a number of integrally forged, curved, locking teeth, the engineering of which is of such shape, angle and position on a convex bearing surface as to create a lock which requires a much higher wrench torque for release than for application at normal bolt loads. MacLean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.

Use postpaid card. Circle No. 50

CONTAINER LATCH WITH 750 LB. LOAD CAPACITY

The Hook-Lock, a latching device for use on containers is positive-locking without springs, and provides a closing pressure of 200 lbs. Load-carrying capacity of the standard fastener is 750 lbs. The latch lies flat against the container and extends 7/16" from the container surface. Since operation is parallel to mounting surface, no space for operating clearance is required. Simmons Fastener Corp., North Broadway, Albany 1, N.Y.

Use postpaid card. Circle No. 51

DRAIN PLUGS WITH PRE-ASSEMBLED WASHERS

Drain or filler plugs are fabricated with pre-assembled washers and sold as an integrated unit. The cold formed plug is available in steel with neoprene or fiber washers permanently affixed. Present stock assemblies are limited to 3/8"-18 sizes. Pittsburgh Plug and Products Corp., P.O. Box 304, Evans City, Pa.

Use postpaid card. Circle No. 52

SELF-LOCKING NUT SPEEDS BLIND APPLICATIONS

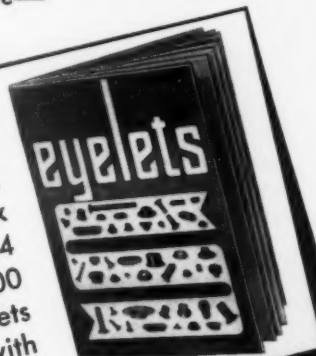
A high carbon steel lock nut eliminates the need for lock washers and speeds up blind fastening applications. The concave undersurface of a P-M locknut guides the screw to hole threads.



Are You Familiar With The Different Articles We Make?

You will find us prepared to supply a type of fastener that is exactly suited to your specific requirements. If you use split rivets, tubular rivets, side-prong rivets, eyelets, washers, grommets, snap fasteners, or any other similar metal article—write for samples and prices—today.

Send for your copy of this valuable free book. Actual size 8 1/2 x 11 — contains 104 pages—over 2000 standard eyelets are shown with dimensions.



EDWIN B. STIMPSON COMPANY.

84 FRANKLIN AVENUE BROOKLYN 5 N.Y.

Use postpaid card. Circle No. 245

The nut is adaptable for both permanent and demountable assemblies. When tightened flat, threads are deformed against the screw for permanent fastening. Waterbury Pressed Metal Co., 300 Chase Ave., Waterbury, Conn.

Use postpaid card. Circle No. 53

CLIP-ON NUTS MAKE PREASSEMBLY PRACTICAL

Carbon steel nuts hold themselves in place over stamped holes so that preassembly is practical where bolting comes at the end of a series of operations. Dot J-nuts are available in three thread sizes and fit ranges of material thicknesses from .030" to .065". Carr Fastener Co., 450 Main St., Cambridge 42, Mass.

Use postpaid card. Circle No. 54

SELF-LOCKING NYLON SCREW WITHSTANDS 300°F HEAT

A nylon fastener is self-locking and withstands up to 300°F continuous heat. Eliminating the need for collars and washers, the screw has tensile strength up to 15,700 psi. Nylon hex nuts, flat washers, balls, lockwashers also stocked, in all colors. Nylogrip Products, 448 Watertown St., Newton, Mass.

Use postpaid card. Circle No. 55

HANDLE DESIGN IMPROVES QUICK-RELEASE PIN ACTION

A new handle design on the 5440 series single-acting Pip pins makes the self-locking, quick release pin handle easier to grasp, insert, remove.

The valley around a larger release button provides additional thumb space for easier operation. Pushing the release button moves spindle to permit steel balls to recede flush with outer surface of pin body for faster insertion or removal of pin. Aviation Developments Inc., 210 South Victory Blvd., Burbank, Calif.

Use postpaid card. Circle No. 56



SEALANT IN KIT FORM FOR DESIGN, EXPERIMENTS

Kit No. 1010 contains ten grades of Loctite sealant. By selecting different grades of sealant, the designer can apply a predetermined amount of locking torque for retaining threaded fasteners; retain bearings and sleeves on shafts or in housings with any desired pushout strength; seal pipe and tubing joints against high pressure



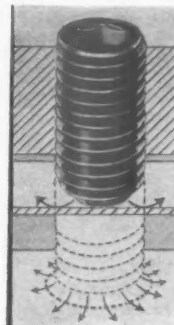
fluids. American Sealants Co., 135 Woodbine St., Hartford, Conn.

Use postpaid card. Circle No. 57

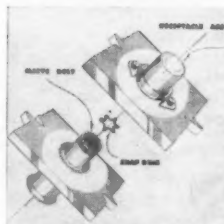
FLARED-POINT SET SCREW WILL NOT SHAKE LOOSE

A set screw is formed so as not to shake loose from its mounting when not in use. The point of the Flare-Lok set screw flares out when it is tightened against the bearing surface. It is then a tightening or adjusting screw, and will not continue to flare with successive tightenings. The screw may be removed without damaging mating thread. It is available in most metals in hex, slotted or slotted heads. Set Screw & Mfg. Co., Bartlett, Ill.

Use postpaid card. Circle No. 58



PANEL LOCK FASTENER ADJUSTS FOR MISALIGNMENT



A structural panel fastener, in standard and self-sealing types, is available in two lug and corner mounting

styles. The self-jacking action of the sleeve bolt eliminates binding problems when removing panel.

This fastener permits panel misalignment of as much as .040" per hole and closes gaps up to 1/8". Fail safe construction prevents over torquing, and the oversized deep hex recess permits power driving and high installation torque. Nutt-Shel Co., 2701 S. Harbor Blvd., Santa Ana, Calif.

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COMPOSITE PLASTIC SCREW WITH METAL CORE

A composite plastic screw with a metal core reportedly has the insulating properties of plastic combined with the strength of metal.

Insul-Screw consists of a serrated metal core with a threaded plastic body. The core carries the torque applied by the driver, eliminating the danger of breaking or distorting the head. Austin Screw Products Co., 4873 West Armitage Ave., Chicago 39, Ill.

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..... with a single feeding

BECO MULTI-SPINDLE MACHINES

perform various combinations of drilling, tapping, pointing, hollow milling, etc., either on one end or on both ends of the part, at high speeds, and they are completely automatic. We will gladly quote you actual production figures from your drawings.

BATCHELDER ENGINEERING CO.
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assembly and fastener engineering

OCTOBER, 1959

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211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160

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assembly and fastener engineering

OCTOBER, 1959

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211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
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111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160

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EXPANSION NUT FOR THIN METAL ASSEMBLIES

A quick-attachment expansion nut has been designed for applications where tapped holes are needed in thin sheet-metal assemblies and is available in six standard thread sizes.



The assembly is fed into square holes where the arched bars are straightened by an inexpensive tool to positively lock the nut in place. This action also opens the retainer sufficiently to permit the nut to float for easy alignment. The McLaughlin Co., 212 Jaikins Bldg., Birmingham, Michigan.

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PREVAILING TORQUE ONE-PIECE LOCKNUT

A one-piece prevailing torque locknut is locked by threads preformed inwardly in three sections of the tapered portion of the nut. The shape of cone sector displacement insures conformity with the mating bolt and maximum friction contact area.



The nut is adaptable to both high and low torque assemblies, particularly high torque stop-nut applications. National Machine Products Co., Utica, Mich.

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LOCK WASHER BARB GIVES HOLDING POWER

Lock washers combine all the desirable features of tooth-type washers with those of live action spring lock washers. Barbed edges provide holding power by imbedding in both nut and bearing surface.



Available are all bolt and screw size diameters from No. 000 to 6" from a variety of materials in many finishes. Positive Lock Washer Co., 181 Miller St., Newark 5, N.J.

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THREADED OR PLAIN BORE SELF-LOCKING INSERT

Self-locking inserts with resilient segments provide a spring grip for shock vibration-resistant adjustments for screws, pins, shafts and other fasteners. All-metal insert with either threaded or plain bore is pressed into drilled hole. Perma-Lock acts as brake for cylindrical, axial and slide movements and eliminates threading in thin and heavy materials. J. B. Plevyak Mfg. Co., 19 Jefferson St., Newton, N.J.



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M•F "off the shelf"

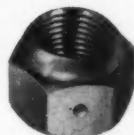
line of lock nuts and weld nuts in all sizes NOW INCLUDES the AMAZING

ME *Whiz-lock*

M•F TWO-WAY® LOCK NUT

for faster application with consistent torque

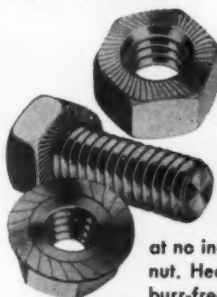
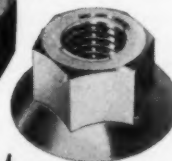
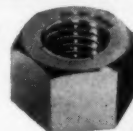
This all-metal double chamfered, re-usable prevailing torque lock nut can be applied to bolt threads from either end. The center locking principle permits bolt end to be flush with top of nut. Can be reappplied up to 10 times.



M•F UNI-TORQUE® LOCK NUT

for high torque consistency in full and jam thickness

This prevailing-torque lock nut will withstand terrific vibration and shock loading; retains its locking ability for as many as 10 RE-applications. This is the lock nut that enables you to predict—and maintain—UNIFORM bolt tension.



The amazing Whiz-Lock... based on an entirely new concept, delivers MORE locking power, MORE bolt tension with LESS torque. Locks onto the work, close to the hole. COSTS NO MORE! This revolutionary design can be produced on our special machines at no increased cost. A far superior lock nut. Heat treated, high tensile strength, burr-free—very high re-usability.

NEW!

THE M•F

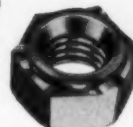
Whiz-lock

free spinning—handles like a common nut!

M•F PROJECTION WELD NUT

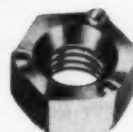
for low cost assembly

Solve production delays, cut manufacturing costs—fuse nut to the product in exact location. Engineered for assembly simplification. Available with the patented M-F Two-Way locking feature.



Pilot type

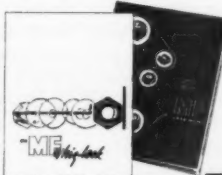
Recessed type



patents pending

BROCHURES AVAILABLE:

The M-F Products Catalog—valuable data on torque and bolt tension. The Whiz-Lock Brochure.



MACLEAN-FOGG LOCK NUT CO

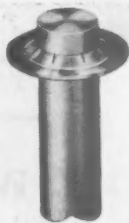
5535 North Wolcott Avenue
Chicago 40, ED 4-8420

Offices in Principal Cities

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PUSH-TYPE RETAINERS FOR RODS, SHAFTS AND AXLES

Notching and grooving are eliminated by heavy-duty spring steel fasteners which push on plain, round shafts, rods and axles and exert strong removal resistance, whether seated or unseated against parts. Application is made with a steel tubing applicator. Fasteners are available in sizes for rod diameters from $\frac{1}{8}$ " to $\frac{1}{2}$ ". Require small space, with overall heights ranging from .050" to .112". Samples of Type U retainers are available. The Palnut Company, 79-L Glen Road, Mountainside, N.J.



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LOCKBOLT FASTENER FOR WIDE MATERIAL THICKNESS

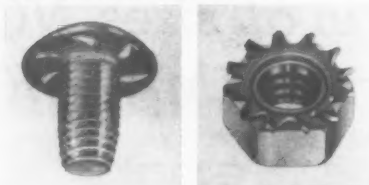
A new utility design of the Huckbolt fastener features a wider material thickness range. Designated the C6L, the fastener provides greater bearing area and permits broader dimensional tolerance in hole preparation. The fas-



tener is installed with standard air-driven or hydraulically driven power tools, or with hand tools where applicable. The lockbolt is available in $\frac{3}{16}$ ", to $\frac{1}{2}$ " nominal pin diameters and in all head styles for metal-to-metal application. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

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SCREW FOR FIBREGLASS, ALUMINUM, STEEL



Only finger pressure is required to retain the rivet-headed Nibscrow while a Keps (pre-assembled nut and lock washer) is tightened onto the screw from beneath. A large clearance hole can be used, overcoming alignment problems.

"Nibs" under the head keep the screws from turning, but do not cause cracking and chipping of the fiberglass. No bosses or square holes are required. This screw can also be used effectively in unhardened steel, aluminum, wood. Shakeproof Div., Illinois Tool Works, St. Charles Rd., Elgin, Illinois.

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SELF-LOCKING HEX NUT FOR HIGH-TEMP. SERVICE

Capable of being used with short-threaded bolt series NAS1103 or NAS1503, the Flyweight self-locking hex nut series is a reduction by two in hexagon size permitting the use of smaller wrenches and narrower bolting flanges. It is said to replace up to 19 assorted hex nuts.



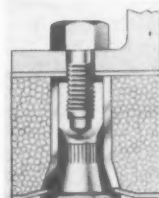
Number T99S low beam is made from chrome-moly vanadium alloy steel, with nickel cadmium diffused plating for 160,000 psi at 550°F. 90,000 psi at 900°F. Boots Aircraft Nut Corp., Norwalk, Connecticut.

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STRUCTURAL FASTENER FOR SANDWICH PANELS

A structural-type fastener provides additional strength for a variety of sandwich-type panels now in broad use in industry.

The fastener consists of two pre-assembled parts: the body and expanding sleeve. The body section comes in many forms,



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Sizes from $\frac{1}{8}$ " to 6" diameter in 16ths for bolt mountings from #4 to $\frac{3}{8}$ ". Available in aluminum, steel, and stainless. All manner of high and low temperature insulation cushion materials.



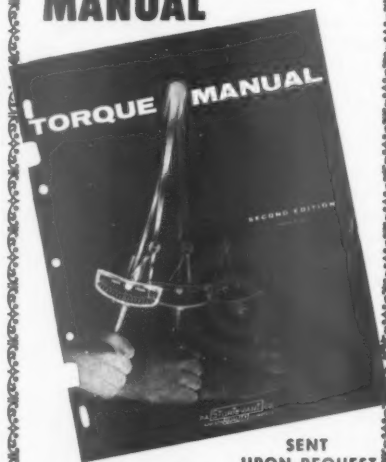
TA Mfg. Corp. 4607 Alger Street • Los Angeles 39, Calif.
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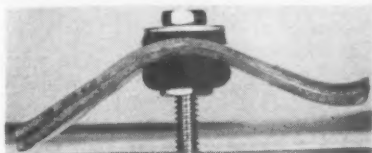
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Assembly and Fastener Engineering

including internal threaded, threaded stud, male rivet and thru-bolt types. Flush applications with minimum dimple are assured on both skins through die action of body and sleeve. The Delron Co., Inc., 5224 Southern Ave., South Gate, Calif.

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SIDE LAP FASTENER SEALS OUT THE WEATHER



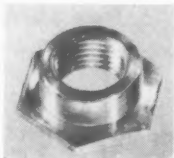
A side lap fastener is installed from the weatherside of translucent plastic or light sheet metal in construction applications. Lap-Lox (W) consists of hex bolt, two sealing washers and a threaded insert bonded to neoprene sleeve to prevent spin-out. Inserted in $\frac{3}{8}$ " hole, the sleeve expands to lock side laps. It is weatherproof and does not mar sheet surface. Fabricated Products Co., West Newton, Pa.

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MINIATURE TURNED NUTS HELD TO $+.000$ " AND $-.005$ "

Miniature turned nuts are supplied to specifications with standard or special threads (No. 0 and larger) in diameters as small as $\frac{1}{8}$ " hexagon. Lengths and diameters are held to $+.000$ " and $-.005$ ". The nuts are tapped square with faces countersunk on both sides, burrless, degreased and can be furnished in either single or double-chamfered styles and special shapes. Minimum lots of 5000 per individual item. Fischer Special Mfg. Co., 496 Morgan Ave., Cincinnati 6, Ohio.

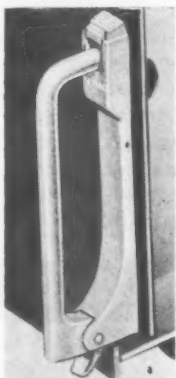
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CHASSIS LATCH FEATURES PUSH BUTTON RELEASE

The 35L latch features a push-button release mechanism on the locking device which permits quick, mechanical release of multiple pin connectors commonly used with plug-in chassis. When returned to the locked position, the latch becomes a carrying handle. Adequate mechanical advantage is provided to engage connector plugs with forces as high as 400 lbs. without the danger of deforming structures. Camloc Fastener Corp., 14 Spring Valley Road, Paramus, N.J.

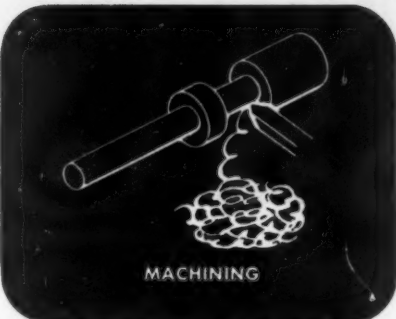
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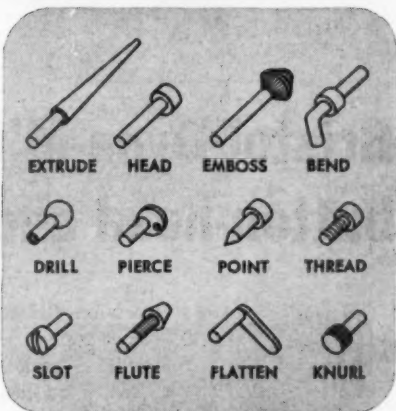
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Purchasing and engineering people can profit from a brief demonstration staged by Progressive cold upset experts. Special fasteners and small parts you now use or contemplate using are analyzed for adaptability to cold heading.

Please write today, asking for a Cold Upset Analysis Session. Or outline your problem to us and we will promptly mail examples of first cost and assembly savings gained by parts produced by Progressive.

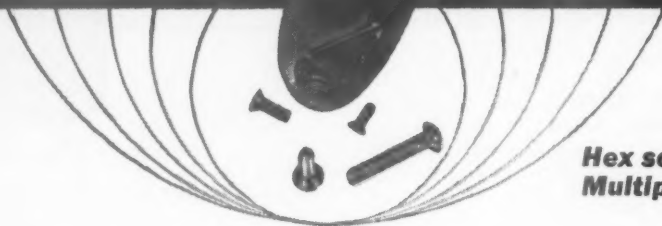
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*another
Bristol first*



**Hex socket and
Multiple-Spline socket**

Bristol Dyna-Mites—miniature, No. 0, 1, 2, and 3 button-head and flat-head socket screws

*Here's news
for designers
of precision
equipment—
electronic
components—
missile
parts*

Precision Bristol button-head and flat-head socket screws are now available in smaller standard stock sizes than ever before—down to No. 0, in heat-treated alloy and stainless steel (other metals on special order).

Bristol is the first to offer these tiny button-head and flat-head socket screws, aptly named Bristol "Dyna-Mites," as stock items—thanks to increasing demand from manufacturers of a wide variety of precision equipment such as electronic components and subassemblies, computing machines, cameras, and scientific instruments, and other precision products of every kind. Larger sizes (to $\frac{3}{4}$ " for flat-head and $\frac{5}{8}$ " for button-head) have been standard

items with Bristol for many years.

The new button-head and flat-head screws will supplement Bristol's already extensive line of Dyna-Mite socket cap and set screws in sizes down to No. 0, 1, 2, 3—long a Bristol specialty. They feature the same superior holding power under shock and vibration, can be wrenched up tighter and loosened, time after time, without damage to the socket. And they're made under the same rigid, exhaustive quality-control requirements.

Get data on these tiny Bristol Dyna-Mite button-head and flat-head socket screws from your authorized Bristol socket screw distributor, or write to the address below. A.B.3A

Precision socket screw manufacturers since 1913

Bristol's Hex Socket Screws

Bristol's Multiple-Spline Socket Screws

*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1½" diameter.

THE
BRISTOL
COMPANY
SOCKET SCREW DIVISION
WATERBURY 20, CONN.

USEFUL LITERATURE

Highlights among the literature reviewed during the past year are being repeated this month. To receive your copy, use the postpaid card opposite page 68.

PUSH-ON LOCKING NUTS

The two-way fastening of the Speed Nut—an inward thread lock and outward spring lock—is sketched and various types specified in 16-page Bulletin 350-1. The attractive pamphlet illustrates nuts in use as grips, clips, clamps, latches, molding, tubing, retainers, all design variations from the basic flat push-on fastener. Tinnerman Products, Inc., Box 6688, Cleveland 1, Ohio.

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TORQUE WRENCH USE

Guaranteed exact tension is highlighted in a four-page loose-leaflet on torque wrench use. A micrometer-style indicator is pre-set for desired tension and operator pulls on wrench handle until "breaking-point." Two models available. Users listed. Reasor Mfg. Co., St. Charles, Ill.

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LOCK AND WELD NUTS

Engineering data and features of nine locknuts are presented in 14-page two-color bulletin, which includes complete price list. Cross-sectional drawings, illustrations of typical applications included for hex, countersunk, center-lock, weld and lock nuts. Grip Nut Co., South Whitley, Ind.

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SCREW PRODUCTS

A complete line of threaded fasteners in a variety of metals, head styles and finishes is described in catalog form. Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.

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ASSEMBLING SMALL PARTS

Automatic assembly machines ranging from complex, indexing units, simple two- or three-station assembler to individual tools or feeds within an existing line are custom designed and fabri-

cated. Brochure's photos and text present sample products which insert, crimp, stake, drive screws, weld, rivet. Sperry Products, Inc., Danbury, Conn.

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ADHESIVES, SEALERS

Official U. S. Government specifications for a wide variety of adhesives, coatings and sealers are listed in a 23-page catalog. The catalog lists, in numerical form, military, Army, and Federal specifications, their definitions and the corresponding 3M adhesive, coating or sealer that meets these specifications. Adhesives, Coatings and Sealers Div., Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich.

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COLD HEADING SAVINGS

Case histories where parts designed for cold heading have effected substantial savings are detailed in "Bank Book of Savings in Cold Heading." The pamphlet presents 16 types of contract work this manufacturer performs. The Torrington Co., 40 Norwood St., Torrington, Conn.

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AIRCRAFT FASTENERS

Literature describes aircraft fasteners from the smallest machine screw to largest structural bolt. Parts available in hex, hex-key, Hi-Shear and Torq-set head configurations in most materials. Air Industries of California, 343 S. Glasgow Ave., Englewood 1, Calif.

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FACTS ABOUT FASTENERS

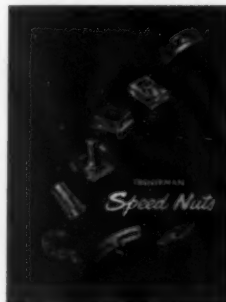
A 16-page illustrated pocket-size booklet "Helpful Hints" contains technical facts to help users obtain maximum economy and performance in application of standard fasteners. Information on selecting the right grade of bolt, proper torque for bolts, bolt



(See 77)



(See 76)



(See 75)

and abuse—are also related. A section is devoted to selection of tapping screws; charts show safe load curves and torque curve for various diameters and grades of bolts. Russell, Burdall & Ward Bolt and Nut Co., 101 Midland Ave., Port Chester, N.Y.

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RIVETS—TUBULAR, SPLIT

Current prices for tubular and split rivets per 1000 are listed in a 10-page catalog. Each rivet type is illustrated in actual size and priced by length, diameter, material and finish. Standards and specials available. American Rivet Co., Inc., 849 N. Kedzie Ave., Chicago 51, Illinois.

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DATA ON WASHERS

Washers ranging from 1/4" to 8" O.D. with thicknesses from .008" to 1/2" are presented in an easily-read catalog. Specifications, weight and diameter tables and other information printed in large type. Joliet Wrought Washer Co., Joliet, Illinois.

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THREAD ROLLER

Four-page data sheet reviews Shuster thread roller, giving specifications of latest model and picturing entire line. Also wire straightening and cutting machines of all sizes. Mettler Machine Tool, Inc., 155 W. Adeline St., New Haven, Conn.

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AIR SCREWDRIVERS

Catalog 5927-T specifies complete line of air screwdrivers, nutsetters, drills. Portable models are available in either suspension or pistol grips. Mechanical clutch operation and torque control described. Aro Equipment Co., Bryan, Ohio.

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WELD SCREWS

A complete line of weld screws for projection and spot welding is pictured and described in a product brochure. Typical applications and recommended control settings are given. Accurate Threaded Fasteners, Inc., 2901 W. Montrose Ave., Chicago 18, Ill.

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EYELETTING MACHINERY

How eyeletting solves fastening problems is told in a brochure. Machines with varied degrees of automation depending on application requirements feature settings as small as .032" I.D. because of patented limited travel spindle. Edward Segal, 132 Lafayette St., New York 13, N.Y.

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ASSEMBLY MACHINES

Case histories showing the step-by-step operation of specially-designed assembly machines are featured in a series of bulletins. Machines automatically drill, mill, tap, insert screws, assemble parts. The Bodine Corp., 315 Mountain Grove St., Bridgeport 5, Conn.

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DOUBLE STROKE HEADER

All phases of the operation of the Hi-Pro Header are described in detailed folder: feed, cutoff, heading unit, knockout, too's, motor drive and lubrication. Waterbury Farrell Foundry & Machine Co., Watertury, Conn.

Use postpaid card. Circle No. 91

FASTENERS TO "SPECS"

Facts concerning engineering and production facilities geared to handle requirements for special-purpose or standard fasteners are outlined in a brochure. Pre-assembled bolts and washers, keps, pins, screws and other threaded parts included. National Lock Co., 1902 7th St., Rockford, Ill.

Use postpaid card. Circle No. 92

POWER ASSEMBLY TOOLS

Power tools which automatically control maximum and minimum torque to within 2% of selected figure are featured in a two-color circular. Portable and stationary models drive studs, run nuts and test torque. Specifications listed for 11 models: torque range, type of power, weight, rpm available at spindle, volume of air used per minute. Recent purchasers of Power-Torque tools included. Garvin Brothers, Inc., P.O. Box 536, South Bend, Ind.

Use postpaid card. Circle No. 93

WIRE DRAWERS

"Profits in Cold Heading" is the theme of 12-page Bulletin 111-A which describes a line of wire drawing machines and attachments. Advantages, tensile strength tests, capacities are presented in text and photos. The Ajax Mfg. Co., Euclid Branch P.O., Cleveland 17, Ohio.

Use postpaid card. Circle No. 94



PLASTIC RIVETS

Plastic rivet application is explained in an illustrated brochure. How the one-piece, self-expanding, blind plastic rivets fasten any material from paper-board to metal is shown in examples of usage. Dimensions, engineering data and hole size recommendation. Fastex, 195 Algonquin Rd., Des Plaines, Ill.

Use postpaid card. Circle No. 95

SEMS, SCREWS, TERMINALS

Specialties of the manufacturer are outlined in the Everlock fastener catalog: Sems, lock washers, thread-cutting

screws and terminals. Samples. Thompson-Bremer & Co., 228 N. LaSalle St., Chicago 1, Ill.

Use postpaid card. Circle No. 96

TORQUE WRENCH MANUAL

A manual on the use of torque wrenches contains formulas, adapter problems, screw torque data, applications and general principles concerning torque. P. A. Sturtevant Co., Addison, Illinois.

Use postpaid card. Circle No. 97

CAP SCREW STANDARDS

A complete dimensional standard covering new "1960 Series" hexagon socket cap screws is now available. This new five page standard (Form-CSN) was prepared for designers and engineers. The Holo-Krome Screw Corporation—Hartford, Conn.

Use postpaid card. Circle No. 98

SHEAR RESISTANT PINS

Shear, shock and fatigue are resisted by an alloy steel pin, presented in a four-page brochure. The self-locking principle is explained, specifications are listed and typical applications illustrated. Shear values of models given. Specials available. Driv-Lok Sales Corp., 777 Park Ave., Sycamore, Ill.

Use postpaid card. Circle No. 99



PLUG NUT APPLICATION

Interesting facts about plug nuts—their application and advantages—are brought out in a four-page bulletin. A dimensional chart is accompanied by illustrations showing step-by-step installation. Plug nuts can be hopper fed, can be pressed in more than one at a time, and used with spring-load locating pilots. They are applicable in any thickness of material down to .030" and in any tape size from No. 4 to 3/4". Lamson & Sessions Co., 1971 W. 85th St., Cleveland 2, Ohio.

Use postpaid card. Circle No. 100

SOLVING THREAD PROBLEMS

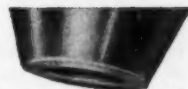
Facilities of a metrology laboratory equipped to help solve user screw thread problems are outlined in a brochure. Close tolerances are claimed for the Cooper fasteners cataloged. SPS Western, 2701 South Harbor Blvd., Santa Ana, Calif.

Use postpaid card. Circle No. 101

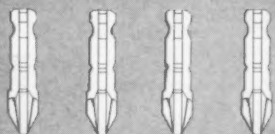
SCREW THREAD INSERTS

Military equipment designers and contractors whose work does not permit use of general commercial tolerances will find Bulletin 689A useful in identifying and accepting screw thread inserts in National Coarse and National Fine sizes through 1" diameter. The 16-page manual has five sections: mili-

Count on *Continental* for this
2-way saving in bit costs



You get 4 HY-PRO PHILLIPS Insert Bits



for the cost of 1



conventional bit

HY-PRO PHILLIPS Insert Bits cost only about one-fourth as much as solid bits, and there is no extra expense for re-sharpening. When a HY-PRO bit wears out, you simply replace it with a new bit . . . and restore *full* driving efficiency at negligible cost.

POWER BIT HOLDERS
 made in types and sizes to fit all driving tools



HY-PRO PHILLIPS Insert Bits are FORGED

Tested and proved to
outlast other bits
2 to 1



Best comparable bit



HY-PRO Phillips Bit

Each bit drove the same number of screws

High strength *forged* HY-PRO Bits are production tested and proved to have an average service life *double* that of the best comparable bits. Many users report even greater margins of extra life for HY-PRO bits, often as high as 4 to 1.

Make your own tests— Compare bit life on your toughest driving jobs. Figure *all* costs. Continental Assembly Specialists will cooperate fully in conducting tests. You'll find HY-PRO Insert Bits and Holders your best buy for lasting bit economy.

Precision control with the same Phillips master tools assures uniformly accurate fit of HY-PRO Phillips Bits and HOLTITE Phillips Screw recesses. Use this proved combination for the top efficiency you need in assembly—especially with power and automatic driving equipment—to avoid downtime, rejects, and weak fastenings. For full information, write: Continental Screw Co., 448 Mt. Pleasant St., New Bedford, Mass.

Only CONTINENTAL makes BOTH PHILLIPS SCREWS and PHILLIPS BITS



CONTINENTAL
 SCREW COMPANY, NEW BEDFORD, MASS.
HOLTITE FASTENERS

**HY-PRO TOOL COMPANY . . . DIVISION
 RESEARCH ENG. & MFG., INC. SUBSIDIARY**



HOLTITE PHILLIPS AND SLOTTED HEAD
 WOOD • MACHINE • TAPPING
 THREAD FORMING •
 SEMS • NYLOK
**HY-PRO PHILLIPS
 INSERT BITS AND HOLDERS**

tary standards vs. insert number and reverse, assembly dimensions, typical process sheet for installation and tables of specifications and charts. Heli-Coil Corp., Danbury, Conn.

Use postpaid card. Circle No. 102

RUST RESISTANCE DATA

Laboratory data on the corrosion resistance of various types of stainless steels to various chemicals and corrosive media is listed in table form. Catalog 29-A presents over 7000 types of stock stainless steel fasteners, including new AN & MS parts. Star Stainless Screw Co., 655 Union Blvd., Paterson 2, N.J.

Use postpaid card. Circle No. 103



MACHINE SCREW NUTS

Prices for machine screw nuts in steel, brass and aluminum are quoted in a four-page brochure. Equipment for producing single and double chamfered standard nuts and large and small pattern nuts is pictured. T.N.F. Corp., 1052 E. Elizabeth Ave., Linden, N.J.

Use postpaid card. Circle No. 104

SHORT PIPE PLUGS

Cold headed $\frac{1}{8}$ " pipe plugs for use in electric motors and for other applications are explained in data sheets. Threads are carried completely to the crown. Plugs will not leak at pressures up to 250 psi. Elco Tool & Screw Corp., 1101 Samuelson Rd., Rockford, Ill.

Use postpaid card. Circle No. 105

SPECIAL SHAPED FASTENERS

Headed and threaded rods, bolts, studs and specially shaped fasteners are pictured with specifications in four-page Bulletin 650. Hook and spade bolts, U-bolts, eye bolts are shown. Rods can be bent to any shape. Ohio Rod Products Co., Inc., 20251 First Ave., Berea, Ohio.

Use postpaid card. Circle No. 106

RIVETS

Data sheets list rivets from $\frac{1}{32}$ " to $2\frac{1}{2}$ " in diameters and hard-to-get screw items available in all metals. Fasteners made to AN-MS-NAS specifications. Ace Screw and Rivet Co., 959 W. 37th St., Chicago 9, Ill.

Use postpaid card. Circle No. 107

CUSTOM DESIGNED CLIPS

Clips—one-piece or assembled—are custom designed and mass produced to order. Brochure illustrates samples of special fasteners manufactured for automotive, appliance, electrical and furniture industries. Stampings, nut and washer assemblies, cold-headed parts

are also available. Anchor Fasteners, Inc., 83 Bank St., Waterbury, Conn.

Use postpaid card. Circle No. 108

RETAINING RINGS

Four series of industrial retaining rings are specified in a 16-page, two-color catalog. External rings applied radially to shafts are available in dispenser stacks. The data is accompanied by application suggestions and dimensional drawings. Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, New Jersey.

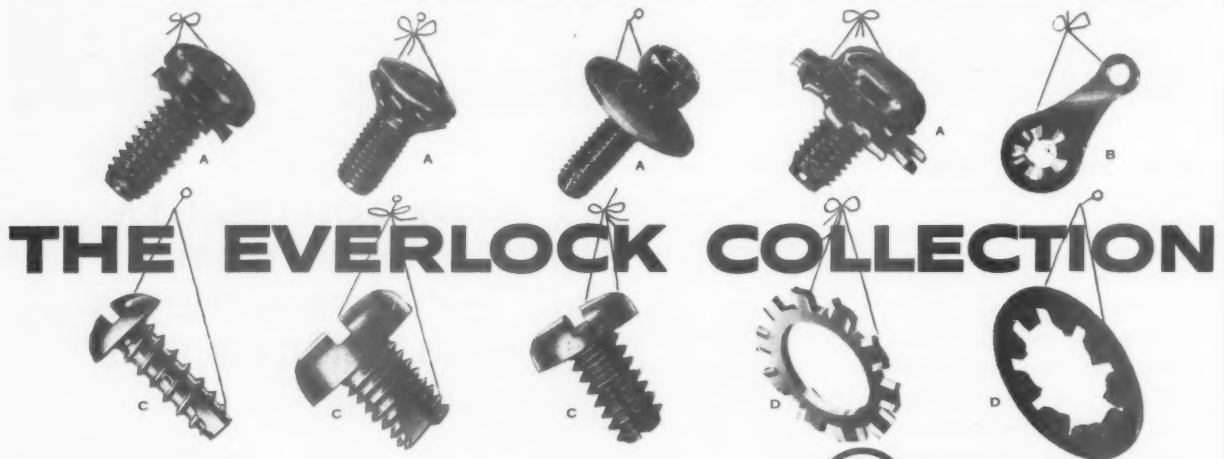
Use postpaid card. Circle No. 109



FASTENING SOFT METALS

How a self-tapping, self-locking insert acts as a permanent fastener in machinable materials is discussed in a 12-page bulletin. Tap-Lok threaded bushings are used with soft metals, plastic and wood. Types, applications, specifications, installation tools are pictured and described. Groov-Pin Corp., 1125 Hendricks Causeway, Ridgfield, New Jersey.

Use postpaid card. Circle No. 110



NOW MORE EXTENSIVE THAN EVER—OUR COMPLETE LINE OF INDUSTRIAL FASTENERS AND COLD-HEADED SPECIALTIES

These are just a few of the many Everlock industrial fasteners used consistently by leading automotive, appliance and other metalworking manufacturers—some of them our customers since 1918. When you buy Everlock fasteners, you deal with one of the few completely integrated manufacturers of lock washers, Sems, thread-cutting screws, terminals and cold-headed specialties. We are prepared to deliver on short notice a complete line of competitively priced, top quality washers from stock in our plant or your local distributor's warehouse. Talk to your local Everlock representative for expert assistance with fastener problems or use the coupon to send for samples and our current catalog. Blueprints welcome! Let us quote on any of your fastener needs.

A. Sems—Available with any style head, thread, washer and point. **B. Terminals**—Tooth-type locking or plain. **C. Thread-Cutting Screws**—Type 1, 23 and 25. **D. Lock Washers**—Tooth-type lock available in internal, external, countersunk, combination internal-external, dish-type, and dome washers. Also Belleville or serrated Belleville.

Use postpaid card. Circle No. 231



Thompson-Bremer & Co.
Division of
American Machine
& Foundry Company

Thompson-Bremer & Co., 228 N. LaSalle Street, Chicago 1, Ill

Please send me: _____ AFE-10
_____ Everlock fastener catalog _____ samples of
Everlock industrial fasteners and cold-headed specialties.

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____

BOND DRYING OVENS

Ovens for any product requiring heat is the subject of an illustrated bulletin: baking, preheating, drying, brazing. Batch, bench, cabinet, compartment and conveyor type ovens manufactured. Grieve-Hendry Co., Inc., 1441 W. Carroll Ave., Chicago 7, Ill.

Use postpaid card. Circle No. 111

HIGH TENSILE STUDS

Alloy, stainless and non-ferrous studs for refineries, chemical plants, utilities and general industries are detailed in a catalog. Threaded steel and non-ferrous rods also cold rolled. Claude Sintz Inc., 1928-40 Stanley Ave., Detroit 8, Michigan.

Use postpaid card. Circle No. 112

TAPER PINS

Taper pins for assembly in diameters from 7/0 to No. 14 and up to 13" lengths are priced in an engineering sheet. New threaded end pin has many uses for blind hole assemblies. Samples. John Gillen Co., 2558 S. 50th Ave., Cicero 50, Illinois.

Use postpaid card. Circle No. 113

PARTS FEEDERS

Standard hoppers in 14" through 18" diameters are pictured and described in a bulletin. Units are equipped with 115 volt totally inclosed motor. Feed-matic-Detroit, Inc., 26907 W. 7 Mile Rd., Detroit 40, Mich.

Use postpaid card. Circle No. 114

SCREW SLOTTERS

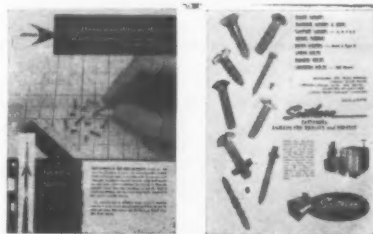
A data sheet pictures and details German-made Peltzer & Ehlers screw slotting machinery. Production up to 1000 pieces per minute is claimed. The Boltmaster Co., 5306 W. 130th St., Cleveland 30, Ohio.

Use postpaid card. Circle No. 115

MINIATURE SOCKET SCREWS

Miniaturization and high reliability is the theme of a four-page bulletin describing a line of flat head and button head socket screws. Applications, drawings and specifications of the fasteners are presented. The Bristol Co., Waterbury 20, Conn.

Use postpaid card. Circle No. 116

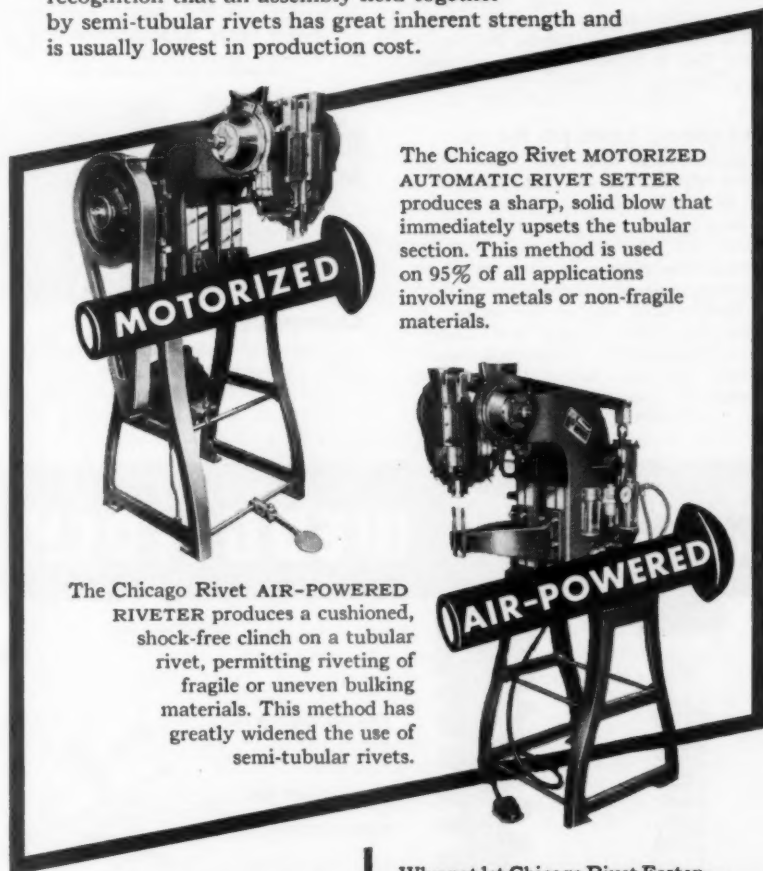


SCREW PACKING CHART

A new bulk packing chart, BP-2, gives complete information on a packing and palletization system designed for large or small users of bulk screws. Where screws are used or moved in small bulk quantities, the 9" x 9" x 6 1/2" carton is easily handled as it weighs about 45 lbs. For handling large quantities of bulk screws, Southern provides

Why *Chicago Rivet* Offers TWO METHODS for Clinching Semi-Tubular Rivets

It is part of a widening service based upon industry's recognition that an assembly held together by semi-tubular rivets has great inherent strength and is usually lowest in production cost.



The Chicago Rivet **MOTORIZED AUTOMATIC RIVET SETTER** produces a sharp, solid blow that immediately upsets the tubular section. This method is used on 95% of all applications involving metals or non-fragile materials.

The Chicago Rivet **AIR-POWERED RIVETER** produces a cushioned, shock-free clinch on a tubular rivet, permitting riveting of fragile or uneven bulking materials. This method has greatly widened the use of semi-tubular rivets.

FOR YOUR FILES



RIVET CATALOG describes 1388 standard tubular and split rivets and 25 single and multiple motorized automatic rivet setters.



AIR-POWERED RIVETING catalog contains description and specifications of 8 single and multiple riveters—also rivet setters designed for automated operation.

Why not let Chicago Rivet Fastening Engineers tell you which system is best for you. No obligation.

MOTORIZED

Line includes automatic single, multiple and automated setters.

AIR-POWERED

Line includes automatic single, multiple and automated setters.

**Chicago Rivet
& MACHINE CO.**

946 So. 25th Ave., Bellwood, Ill.
(Chicago Suburb) Branch Factory:
Tyrone, Pa.

Use postpaid card. Circle No. 253

a disposable 2-way entry pallet on which are steel strapped 36 of the cartons. Southern Screw Co., Box 1360, Statesville, N.C.

Use postpaid card. Circle No. 117

STOCKED FASTENERS

Bolts, nuts, screws, washers and rivets in all metals are cataloged for fast reference. Manufacturer claims largest stock on east coast. Keystone Bolt & Nut Corp., 125-A Church St., New York 7, New York.

Use postpaid card. Circle No. 118

SPECIAL-HEADED CAP SCREW

A cap screw with a 12-cornered head, but requiring no special tools, is described in a bulletin. The Countr-bor fits flush in standard counterbored holes and is said to wrench tighter and faster. Ferry Cap & Screw Co., 2195 Scranton Rd., Cleveland 13, Ohio.

Use postpaid card. Circle No. 119

NATIONAL THREAD DATA

"Unified and American National Screw Thread Data" is the subject of "H & G Die Headlines" digest. The 11-page loose-leaflet presents the major, minor and pitch diameters giving the classes, allowances, tolerances of all internal and external threads up through 2". Particularly slanted for readers in thread designing, gaging and inspection and production of threaded parts. Eastern Machine Screw Corp., 25-48 Barclay St., New Haven 6, Conn.

Use postpaid card. Circle No. 120

SPECIAL FASTENING TOOLS

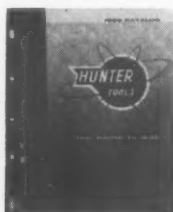
A series of four catalogs cover nut running, screwdriving and miscellaneous fastening tools. Special sockets and wrenches for difficult applications, magnetic bit holders, extensions, adapters, power bits, hand drivers, friction chucks are treated with photos, drawings and large, easy-to-read specifications. The Apex Machine & Tool Co., 1054 S. Patterson Blvd., Dayton 2, Ohio.

Use postpaid card. Circle No. 121

NEW WASHER PACKAGING

Catalog 40-B alphabetically indexes specifications on washers and stampings for quick finding. Also described is a handy method of packaging washers from 2 lb. to 200 lbs. in clip packs and plastic tubes. Wrought Washer Mfg. Co., 2102 S. Bay St., Milwaukee, Wis.

Use postpaid card. Circle No. 122



ASSEMBLY TOOLS

A complete line of manual assembly tools, including nut, screw and hex drivers of all types, are illustrated and specified in a 32-page catalog. New

design features are pointed out. Prices given. Hunter Tools, 9851 Alburdis Ave., Santa Fe Springs, Calif.

Use postpaid card. Circle No. 123

CORROSION GUIDE

A 24-page "Corrosion Guide" for fasteners is of value to manufacturers and production engineers. Commonly-used metals are tabulated to show approximate physical and mechanical properties and the suitability for manufacturing applications. There is a cross index for chemically equivalent specifications that cross-references these metals to ASTM, military and Federal specifications. H. M. Harper Co., 8200 Lehigh Ave., Morton Grove, Ill.

Use postpaid card. Circle No. 124

FASTENER TESTING

Facilities for fastener testing and analysis are presented in brochure form. Qualification and evaluation programs to specifications and standardization studies are also discussed. Almay Research & Testing Corp., 3510 E. 14th St., Los Angeles 23, Calif.

Use postpaid card. Circle No. 125

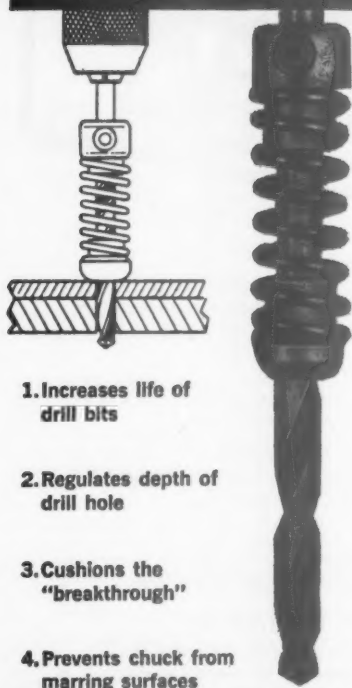
1000 STANDARD PARTS

Over 1000 standard parts made from any metal and in all finishes are illustrated in the General Catalog. Eyelets, rivets, grommets, washers, snap fasteners, hole plugs, terminals and others are carried in stock. Edwin B. Stimpson Co., 84 Franklin Ave., Brooklyn 5, N.Y.

Use postpaid card. Circle No. 126

Stop Breaking
Drill Bits!

WEDGELOCK DRILL STOP



1. Increases life of drill bits
2. Regulates depth of drill hole
3. Cushions the "breakthrough"
4. Prevents chuck from marring surfaces

The Wedgelock Drill Stop consists of two steel end pieces connected by a coil spring. Slips over standard size drills from #50 to 5/16" dia., and is adjusted for required depth simply by tightening set screw. Special sizes available on request.

Wedgelock Clamps and Fasteners



Sheet Metal Clamps
Sets and releases with one hand in one operation. Many styles.



Edgelock Fasteners
Spring actuated. Powerful. Applied with pneumatic or hand pliers.



Speed Bolt Fasteners
Wide variety of holding pins to fit one standard body. Holds up to 250 lbs.



Wing Nut Fasteners
Handles thicknesses up to 2 1/2". Adjustable pressure. Many sizes.



Spring-Actuated Fasteners
Fast alignment of rivet and bolt for lighter materials. Applied with pliers.

Wedgelock makes the greatest variety of fast-action clamps and fasteners in the country. For information on these and other Wedgelock products write—

WEDGELOCK CORPORATION
5446 Satsuma Avenue
North Hollywood, Calif.

Use postpaid card. Circle No. 254

BLIND RIVETING

A hammer driven rivet for blind or limited access application is described and cataloged in six-page brochure. The aluminum alloy Pin-Grip is assembled with knurled drive pin which, when driven flush with the head, expands the slotted shank and grips firmly. Six type heads available. Specifications, typical applications. Star Expansion Co., Mountainville, N.Y.

Use postpaid card. Circle No. 127



COLD-HEADED FASTENERS

Cold-headed fasteners—rivets, nails, threaded parts which are job-designed can offer flexibility, speed, strength and appearance, according to this descriptive folder. Custom-fitted fasteners from .024" diameter to 3/8" and from lengths of 1/32" in the small diameter to 7" can be made. John Hassall, Inc., Box 2246, Westbury, L.I., N.Y.

Use postpaid card. Circle No. 128

THREAD ROLLERS

Three planetary thread rolling machine models with speeds ranging from 250 to 800 pieces per minute are described in 4-page data sheet, containing specifications and illustrations of typical work. Frutson Corp., 5295 W. 130th St., Cleveland 30, Ohio.

Use postpaid card. Circle No. 129

STAINLESS STEEL DATA

Valuable research findings on stainless steel, as particularly related to hex-socket screws, is contained in 16-page Bulletin G-22. Both "pros" and "cons" of various types of stainless steel alloys used in fastener manufacturing cited. The booklet includes test methods, temperature characteristics, tables of chemical composition and mechanical properties and degree of corrosion resistance to hundreds of substances. Allen Mfg. Co., Hartford, Conn.

Use postpaid card. Circle No. 130



SPOT WELD FASTENERS

Six-page Bulletin 595 illustrates typical applications for each of six spot weld fasteners; nuts, screws, pins. Specifications are listed for stock parts. Recommended weld control settings are conveniently charted for each part

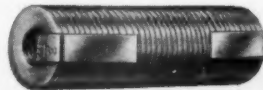
Introducing a new service for users of WASHERS...

**PRE-WASHED and PLATED
MILWAUKEE WROT WASHERS**
now supplied in
Pre-counted, Pre-packaged



*U.S. Pat. Off.
Registration Pending

Here is a helpful new service for users of washers... simplifying and improving handling on the job as well as in the stock room. Now all Milwaukee Standard Wrot Washers from 3/16" to 5/8" (bolt or shaft sizes), can be supplied in compact, pre-counted and pre-packaged KLIP-PACS, as illustrated. They are held together by a snug, strong metal clip, especially designed for this purpose and automatically attached by special machines — with the washer size stamped right on the end of the clip for quick and accurate identification.



KLIP-PAC Gives You These Benefits:

- KLIP-PAC** prevents "mixing" of sizes. The right size and type of washer is segregated from other sizes for correct assembly applications and for the time-saving convenience of workers.
- KLIP-PAC** greatly simplifies stock room handling as well as requisitioning and inventory checks.
- KLIP-PAC** helps to reduce washer losses... cuts fastener costs.
- KLIP-PAC** Washers are washed and plated before clip-assembly. They come to you clean, ready to use on any type of assembly where cleanliness of both washers and workers' hands is important.



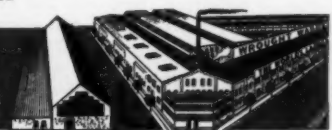
SPECIFY: KLIP-PAC on your next stock requisition for Milwaukee Standard Wrot Washers.

Washed Standard Washers also supplied in 1 lb. and 5 lb. boxes, as illustrated

**WROUGHT WASHER
MANUFACTURING CO.**

The World's Largest Producer of Washers

2195 S. BAY ST., MILWAUKEE 7, WIS.



Use postpaid card. Circle No. 255

for cold rolled sheet .025 to .187" thick. The Ohio Nut & Bolt Co., 33 First Ave., Berea, Ohio.

Use postpaid card. Circle No. 131

SPECIAL HEAT TREATING

Fasteners are "carbon restored" by a heat treatment which eliminates the surface layer of soft, decarburized steel which causes failure. Description of process in 6-page brochure, complete with illustrations of 4000-item socket and cap screw line. Standard Screw Co., 2701 Washington Blvd., Bellwood, Illinois.

Use postpaid card. Circle No. 132



STANSCREW FASTENERS



SOLDERLESS CONNECTIONS

How air tools make solderless wrapped electrical connections is fully treated in 16-page brochure. The history of solderless terminal connecting, the requirements and advantages, the installation, terminal spacing and dimensions and tool specifications are explained. Keller Tool Co., Gardner-Denver Corp., Grand Haven, Mich.

Use postpaid card. Circle No. 133



SOLDERLESS CONNECTIONS

FASTENER DESIGN SERVICE

How steel fasteners can be specially designed to effect substantial user saving is told in a brochure. Headed, threaded, bent or upset parts in all sizes can be manufactured. Bethlehem Steel Co., 701 E. 3rd St., Bethlehem, Pa.

Use postpaid card. Circle No. 134

PRINTED CIRCUIT PARTS

Miniature parts for printed circuits are swaged to order. Facilities and examples of contact pins, terminals, jacks and other tubular parts from 1/4" to 1 1/4" in diameter are presented in catalog form. The Bead Chain Mfg. Co., 208 Mountain Grove St., Bridgeport 5, Connecticut.

Use postpaid card. Circle No. 135

CUT STUD SETTING COSTS

Nine ways to save time, money, materials in stud setting are pointed out in a pocket-sized flyer. Features of the self-locking, self-tapping Schwenke stud are given and a form invites figures for cost comparisons. Pheoll Mfg. Co., 5700 W. Roosevelt Rd., Chicago 50, Illinois.

Use postpaid card. Circle No. 136

SELF-LOCKING NUTS

Self-locking nuts employ nylon collars to grip threads with sealing, vibration resistant action. Types of nuts are illustrated in 4-page circular: clutch, instrument mounting, spline, thin and standard models. Description of facilities and ordering program. Greer Stop

Nut Co., 2618 W. Flournoy St., Chicago 12, Illinois.

Use postpaid card. Circle No. 137

STUDS AND HEX NUTS

Alloy stud and high carbon hex nuts properties are presented in a four-page brochure. Information is listed on standard, special and stainless steel grades with recommendations for various service conditions. Bolt and Nut Div., Republic Steel Corp., 1441 Republic Bldg., Cleveland 1, Ohio.

Use postpaid card. Circle No. 138



MAGNETIC SOCKETS

A line of magnetic sockets designed to eliminate hard starting of fasteners during assembly is presented in a four-page guide. The sockets will hold cap screws or nuts in position while the part is being started and tightened. Specifications for 14 types are given. Cornwell Tool Co., 4548 Milwaukee Ave., Chicago 30, Illinois.

Use postpaid card. Circle No. 139



VARIED NUT LINE

Clinch, weld, spring clip nuts and nut washers are cataloged in a loose-leaf folder. Dimensional line drawings and specifications for each product are attractively presented. Mount Clemens Metal Products Co., 2480 W. Maple Rd., Birmingham, Michigan.

Use postpaid card. Circle No. 140

SPIRAL SPRING PIN

Typical applications for heavy, medium and light duty spiral spring pins are pointed out in a brochure. Coiled Spirol pins, when pressed into a hole, are said to eliminate reaming. C. E. M. Co., 137 School St., Danielson, Connecticut.

Use postpaid card. Circle No. 141

COLD HEADING WIRE

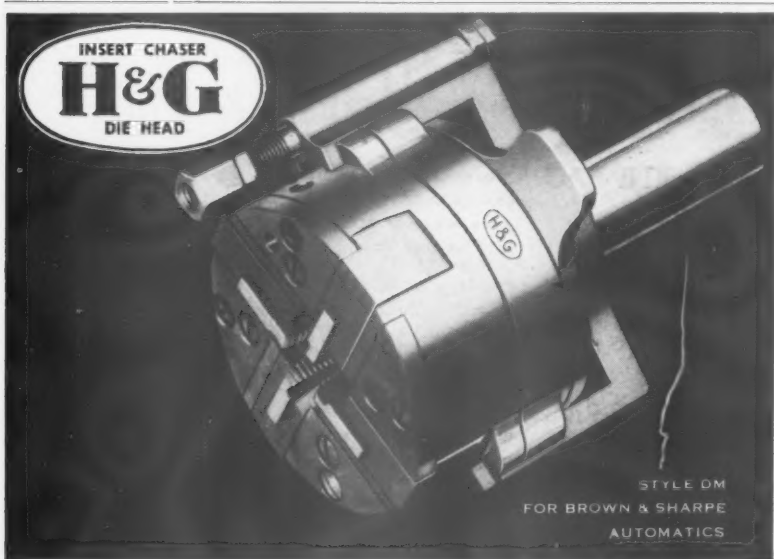
"Cold Heading Facts!" discusses methods, technical facts, wire requirements and other data concerned with cold heading wire. The booklet makes claims for the flowability of XL wire. Keystone Steel & Wire Co., 1000 Industrialist St., Peoria 7, Ill.

Use postpaid card. Circle No. 142

SET SCREWS

Standard and special set screws are specified and priced in a catalog. Cup, oval, round, flat, cone and dog points are available in headless slotted, square and socket heads. Special heads available are milled, slabbed, double slot and knurled. George W. Moore, Inc., 91 Beaver St., Waltham 54, Mass.

Use postpaid card. Circle No. 143



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For approximately \$50 you get a dozen sets of 1/16-16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

FREE: "UNIFIED AND AMERICAN SCREW THREAD DIGEST."

THE EASTERN MACHINE SCREW CORPORATION, 25-48 Barclay St., New Haven, Conn.

Use postpaid card. Circle No. 256

FASTENERS OFF-THE-SHELF

Catalog specifies sizes and illustrates types of bolts, nuts, screws and washers maintained in stock. Over 250,000 fasteners available from off-the-shelf. Detroit Bolt & Nut Co., 4520 Maybury Grand, Detroit 8, Mich.

Use postpaid card. Circle No. 144

AIRCRAFT PARTS

Immediate service is emphasized in a catalog specifying close tolerance aircraft fasteners and parts. All sizes, types, and materials (stainless and nylon are specialties) available in AN, MS and NAS specifications. Eastern States Sales Co., 476 U. S. Highway 46, Hackensack, N.J.

Use postpaid card. Circle No. 145

FILLISTER HEAD SCREWS

"AN" drilled fillister head machine screws are specified in Price List No. 250. Length, diameter, materials are given in price-per-thousand form. Aircraft Quality Fasteners, Inc., 308 Clarkson Ave., Brooklyn 26, N.Y.

Use postpaid card. Circle No. 146

STAINLESS STEEL PARTS

Stainless steel fasteners are cataloged in a 48-page indexed stock list and data book. A complete line of 12 types of standard screws are available, as well as bolts, rivets, nuts, washers, balls, pins, nails, studs, rods, keys. Ten pages are devoted to helpful tables on AN specifications, nominal composition, corrosion resistance, estimated weights and applications of stainless steel products. Allmetal Screw Products Co., Inc., Garden City, N.Y.

Use postpaid card. Circle No. 147



SEALING WASHERS

Washers which make any threaded fastener leakproof are described in a four-page brochure. Sealing upward, outward and downward against liquids and vapors in products or construction, the washer is illustrated and shown in application. Bartite Products Corp., Subsidiary of L. J. Barwood Mfg. Co., Everett 49, Massachusetts.

Use postpaid card. Circle No. 148

MINIATURE SCREWS

Miniature machine screws are available in sizes No. 0 and 1 in steel, stainless steel or brass; and in head styles and sizes to specification. Bulletin outlines manufacturing facilities and gives ordering information. Harvey Hubbel, Inc., State & Bostwick Sts., Bridgeport 2, Connecticut.

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FOR
MASS PRODUCED
PRECISION...

YOU CAN'T BEAT
Fischer TURNUED
BRASS AND
ALUMINUM NUTS

In the game of tick-tack-toe, the right second move is very important. It can pre-determine the winner.

The same principle applies in purchasing precision nuts. *First:* decide the type and size of nut required. *Second:* specify the recognized source for quality, delivery and price . . . Fischer Special Mfg. Co.

As the leading producer of "turned" nuts, Fischer supplies standard, special and miniature nuts to exact customer specifications. Fischer nuts, mass produced by unique automatic machines, cost no more than those made by less precise methods . . . but their uniform accuracy assures fewer problems and new savings in fastening and assembly operations. *That makes you the winner!*

FOR DETAILS AND SPECIFICATIONS
SEND FOR CATALOG FS-1000.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

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4405-79



Not a New Missile

it's a special fastener

It looks like it's ready to blast-off from Cape Canaveral. But see the threads? They give it away for what it really is—a fastener. And a very special kind, made by Bethlehem.

Our customer uses this special fastener as the point in a grip hook for steam log loaders. It's got to be strong and hard and tough. That's why we hot-forge it from a special alloy steel and heat-treat it. Other manufacturing operations: trimming, descaling, threading.

Forgings, bolts, nuts, rods, stampings—Bethlehem makes every kind of steel fastener specialty. Headed, threaded, pointed, bent, or slotted. Machined, punched, or drilled.

The nearest Bethlehem sales office will give you full details. Or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM STEEL



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INDUSTRY MAKES NEWS



Awarded a \$1500 bonus for his suggestion on cleaning printed circuits, Temco's C. R. Lusk (right) gets his king-sized check, processed as a printed circuit, from president Robert McCulloch.



E. J. Combs (left), manager, congratulates Wes Drol, production manager, as the first shipment of passenger car components move off the line at Chrysler's re-activated Wyoming St. plant in Detroit. Headed for 11 overseas assembly plants, the components include the new Valiant. Complete story on page 86.

PHILCO BUILDS NEW COMPUTER PLANT

Philco Corporation has broken ground for its new multi-million dollar computer center at Willow Grove, Pa.

Located on a 72-acre tract, the plant, with over 200,000 square feet of floor space, will contain national sales offices and research, engineering and manufacturing facilities for producing the Transac S-2000 large scale electronic data processing system and Philco's industrial process control and mobile field computers for the military.

Philco expects to occupy the plant early in November, 1959.

PRINTED CIRCUITRY IDEA NETS BONUS

A Temco Aircraft Corporation process analyst who developed a better method of making electronic printed circuitry has received a cash award of \$1,500—the highest bonus even given by Temco in its seven-year-old employee suggestion program.

The award winner, C. R. Lusk of the Materials and Process Laboratory, developed an improved system for dip-cleaning of copper-clad laminate circuit boards in a formulated chemical solution. The procedure greatly increased quality and reliability of such circuits.

CHRYSLER SUPERVISORS STUDY ASSEMBLY

A pilot plant which even at peak production turns out only one car an hour is the focal point of an extensive assembly training and quality control program for Chrysler Corporation's 1960 passenger cars.

Known as the Clairpointe Plant, the 163,000-square-foot facility is located just behind the company's huge Jefferson assembly building on Detroit's east side. Every part, every assembly and gauge tool, every significant engineering and manufacturing step involved in building the new cars receives thorough testing before volume production gets under way in the regular assembly plants.

Another important aim is to train assembly line supervisors so they are thoroughly familiar with the design and manufacturing details for the new models.

continued

Supervisors and foremen from the company's assembly plants in various parts of the United States work under the direction of a permanent staff. The men remain for a minimum of two weeks.

Directing the pre-production pilot program C. is Granville Sharpe, Jr., who was formerly in charge of quality control in the company's Los Angeles assembly plant. Sharpe said the pre-production pilot program is "the most inclusive pilot program in the industry," for it covers the entire gamut of automobile-making from the arrival of supplies to shipping completely-assembled vehicles.

"We are using production parts and materials only," said Sharpe. "These items are the same as those to be used in the mass production run of the new models after initial sample approval has been made."

Another phase of the program contributing to the uniform high level of quality in all plants is the approval of supplier parts. Approved samples of all parts are on display in a special room, and each item is identified by code number. All parts must receive initial sample approval by the quality control department before volume quantities of the parts are authorized by the purchasing staff.

DAVIDSON REJOINS ANTI-CORROSIVE METAL

John T. Davidson has rejoined Anti-Corrosive Metal Products Co., Inc., of Castleton-on-Hudson, N.Y., and has been appointed sales representative for New England, it was announced by Price Berrien, vice-president and sales manager of Anti-Corrosive. He has had seven years' experience in the stainless steel and nylon fasteners field.

HARVEY HUBBELL NAMES FLORIDA SALESMAN

Courteny T. Cummings of Bradenton, Fla., has been appointed sales representative for the machine screw department of Harvey Hubbell, Inc., throughout the State of Florida.

G.E. WELDING CONTROL HQS. TO DETROIT

General Electric is transferring its resistance welding control business to Detroit.

Responsibility for advanced engineering of the line also is being transferred to Detroit. Sales and service will continue nationwide through all General Electric apparatus district offices.

The business is being integrated into the custom engineering and manufacturing activity of the Detroit Service Shop. Already completed for much of the line, the relocation—from the company's Specialty Control Department, Waynesboro, Va.—will be concluded by year's end.

ELECTRONICS FIRM JOINS SPS GROUP

International Electronics Industries, Inc., of Nashville, Tenn., will join the Standard Pressed Steel Co. group of industrial companies.

All stock of IEI will be exchanged for 30,046 SPS shares. No changes in management, personnel or operating policies are contemplated at this time.

This move marks broadening participation of fastener manufacturer SPS, which recorded sales of over \$44 million in the first half of 1959, in the electronics industry. IEI pioneered and is now the largest producer of miniature electrolytic capacitors.



H. Thomas Hollowell, Jr., (left) SPS president and Dr. A. M. Holladay, president of IEI, examine miniature capacitors produced by IEI.



"Me? Have production and shipment problems."

Allmetal offers immediate delivery for your stainless steel fastener needs. Thirty years of "Know How" specializing in the manufacturing of stainless steel fasteners is the best answer to your fastener problems. We are constantly alerted to maintain the type and quality of stainless steel fasteners you require for production. Do not hesitate to inform us as to your full requirements.

Write on your company letterhead for latest catalog. This too, automatically places you on our mailing list.



ALLMETAL
SCREW PRODUCTS COMPANY, INC.

MANUFACTURERS OF STAINLESS STEEL FASTENERS
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DIVISION
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DIVISION

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TWX CG 3185 PHONE: AVENUE 2-3232, 3, 4
5822 WEST WASHINGTON BLVD. • CULVER CITY, CALIF.
TWX LA 1472 PHONE: WEBSTER 3-9595

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BELL TO HEAD RB&W WESTERN SALES



James M. Bell has been named to the newly-created position of assistant vice president of sales in charge of the western division for Russell, Burdall & Ward Bolt and Nut Company. The announcement was made by John S. Davey, sales vice president.

Bell joined RB&W as a salesman in 1952 and became Pacific Coast sales manager in July of 1954. He will continue to be headquartered in Los Angeles supervising a sales force covering 11 states.

DOUGHERTY JOINS YALE & TOWNE LOCK DIV.

Carlton D. Dougherty will direct industrial engineering in Yale & Towne's five Lock and Hardware Division plants, announced W. W. Groves, general manager of manufacturing.

Dougherty resigned from his position of vice president of the George Elliott Company, Inc., industrial and management consultants, to accept the position. He has previously been associated, in managerial engineering positions, with Union Bag & Paper Corporation, Bendix Radio Corporation, and E. I. duPont de Nemours.

SCULLY-JONES FORMS NEW RESEARCH CORP.

Formation of the Scully-Anthony Corp., a research and development subsidiary of Scully-Jones and Co., Chicago, is announced by H. Dale Long, president of the parent company and board chairman of the new corporation.

The function of the new organization, with headquarters at 4707 Willow Spring Road, La Grange, Ill., will be to develop new products in the electronic and electromechanical fields.

President of the new corporation is Myron Anthony, formerly director and now special staff member of the

continued



brazing handbook

Contains Information On . . .

- Preform advantages and selection.
- Types of Blanked and Edgewound Washers.
- Alloy calculation charts.
- Features of No Tangle Notch Coil Rings.
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Send for your free copy today!

LUCAS-MILHAUPT Engineering Co.

5051 South Lake Drive, Cudahy, Wisconsin

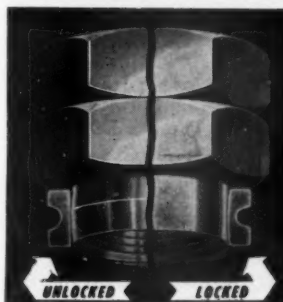
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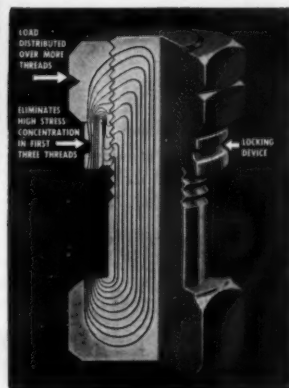
On the
Speedway

In the
Skyways

**Klincher
LOCKNUT**



... take advantage of
ALL the STRENGTH
designed in your bolt!

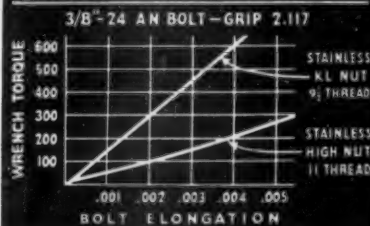


... has no equal where
**TENSILE STRENGTH,
VIBRATION, CORROSION,
HIGH TEMPERATURE
ARE FACTORS!**

On the severest of all jet engines, race car and like applications, Klincher has been tested, proved and acclaimed for these outstanding advantages:

- Can be re-used many times!
- Saves time, labor installing, removing!
- Only one piece to stock and handle!
- Ideal for standard and power wrenches!
- Manufactured in various materials!

TORQUE vs BOLT ELONGATION



Inquiries are invited regarding special locknut problems involving shank nuts, weld nuts, channel nuts and others. Write for data and samples, giving size and application. Address Dept. D-1.

Write for data and experimental samples, giving size and application.

Address Dept. AF-10.



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Electrowriter Division, Comptometer Corporation. Other officers of the Scully-Anthony Corporation are: J. Dudley Lockrem, vice president; Leonard H. Skoglund, Jr., treasurer; Joan Scully, secretary.

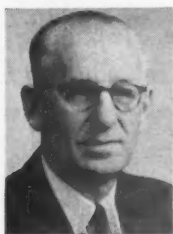
ROTOR TOOL PUBLISHES POWER TOOL MANUAL

"How to Choose and Use Portable Air Tools" is a 91-page handbook just published by Rotor Tool Company, Cleveland, Ohio. The manual is free when requested on company letterhead to Dept. AFE.

Comprised of 14 articles reprinted from technical magazines, the treatment is along three lines: increasing productivity through better air pressures, better maintenance of tools and from selecting the right tool for the right job. Safety and the increasing of productivity from standard machine tools are also dealt with in the manual.

According to H. P. Bailey, president of Rotor Tool, the handbook's purpose is to "suggest to the various factory executives, three concrete approaches to getting more from the portable tool dollar."

STANLEY-HUMASON PRESIDENT DIES



Ernest R. Hanson, 62, president of Stanley-Humason, Inc., Forestville, Conn., a subsidiary of The Stanley Works, died Aug. 13 at Salem, N.H., while on a vacation trip.

Mr. Hanson was associated with Stanley-Humason, Inc. for 45 years. He joined the company, then known as the Humason Mfg. Co., as its purchasing agent in 1915. Prior to his election to the presidency of Stanley-Humason in

March, 1957. Hanson had been appointed vice president in charge of sales in 1948 and general manager in 1953.

CHRYSLER REACTIVATES ASSEMBLY PLANT



Boxed automotive components move down Chrysler's reactivated Wyoming St. sub-assembly plant in Detroit. First shipments to overseas assembly areas were made in August.

Chrysler Corporation announced the reactivation of a former car assembly plant at 6000 Wyoming Ave., Detroit, for shipment of automobile components to overseas assembly plants. The plant has been idle since July 1958, when passenger car assembly operations conducted there were transferred to other facilities in the Detroit area.

Complete renovation of a 280,000 square foot area is due to be completed during the first week of September. The new facility will ship all lines of passenger cars, including the new Valiant and Dodge Dart. Initially a total of 11 assembly plants will be serviced in as many foreign countries.

E. J. Combs, newly appointed plant manager, said that eight basic "assembly" lines, each about 100 feet long, will

BE SURE ABOUT YOUR FASTENERS!

... use the right one ... with the right holding power
... delivered right on time ... at the right price

Speed up your assembly work, eliminate alignment problems, cut your production costs with McLaughlin pre-engineered nuts and bolts that give you positive holding action.

Complete stocks, close liaison, assure you of the quantities you need at the right time and the right price.

Specials—including aluminum and stainless—for every fastening application.

WRITE, WIRE OR PHONE TODAY FOR COMPLETE CATALOG OF STANDARD ITEMS-NUTS-BOLTS-STAMPINGS

McLaughlin

ESTABLISHED 1946

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**man
conquers
mountains**



And, some day, man
will also conquer cancer.
With your help.

Guard your family ...
fight cancer with
a checkup and a check

AMERICAN CANCER SOCIETY

Assembly and Fastener Engineering

be fed underbodies, fenders, doors, motors, glass, trim and the many other items that make up a completed automobile. Instead of assembling these components on wheels, however, the Wyoming plant will pack them in boxes. An overhead crane will be installed above each line for moving heavy items and transferring materials from jitney trucks to the racks and bins on the lines.

All parts peculiar to export cars will undergo an extra inspection, and each shipment will receive individual rust-proofing, depending on its destination. Boxes to be shipped over salt water routes will be oil-sprayed through pre-drilled holes. Shipments to Mexico and Cuba are prepared in another section of the plant where they will be loaded directly on specially equipped railroad freight cars.

EDDY JOINS HARPER METALS DIV.

Donald S. Eddy is a new sales representative for the Metals division of the H. M. Harper Company, Morton Grove, Ill. Eddy brings to this appointment experience gained as owner of a sheet metal organization which fabricates special processing equipment. He is well acquainted with corrosion-resistant materials and their applications.



UNITED SHOE EXPANDS ADHESIVE SALES

As part of a sales expansion program for its line of industrial adhesives, the United Shoe Machinery Corp. has appointed John G. Howley and Charles F. Donovan as new representatives. Howley, formerly with 3M, will handle Pennsylvania and Maryland. Donovan comes from the Angier Products Co. and will cover New England.

John C. Eldridge has been named manager of sales development for hot melt adhesives and applicators while

continued

this machine will

*drive up to
10 screws at
one time . . .*

. . . reducing assembly costs and improving quality. Built for high production jobs where a fixed set up is practical, this multiple spindle screw driving machine automatically feeds screws from a hopper and drives them to a predetermined torque. Evenly distributed pressure eliminates stresses caused by driving home one screw at a time. A simple sliding fixture positions work pieces accurately.

Machine illustrated shows application of multiple spindle screwdriving to assembly of electric power drills.

Send a sample of your assembly and a list of your requirements. We will be happy to show you how multiple spindle screw driving can be applied to your job.

COOK & CHICK COMPANY
2415 West 24th Street Chicago 8, Illinois

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IT'S HERE!

the
**MIRACLE FROM
MID-CONTINENT
SCREW PRODUCTS**

(manufacturers of fasteners)

**SORTS, FILLS,
SEALS, PRINTS**



fasten-PAK

PACKAGING PROCESS

Here is a new concept in packaging of assembly materials. fasten-PAK electronic packaging is less expensive than any other method now employed and when your materials are purchased from Mid-Continent Screw Products Company, your savings are doubled.

Here is what fasten-PAK does for you!

1. fasten-PAK will sort assembly materials in a multiple of sizes and assortment. It will package items in either translucent or kraft opaque bags completely enclosed. The package is printed, filled, and sealed in one operation.
2. Most assembly materials can be packaged by fasten-PAK process. Many of the items include: Wood Screws, Sheet Metal Screws, Machine Screws Square-Head Set Screws, Square Nuts, Hex Nuts, Cap Nuts, Wing Nuts, Round Nuts, Lag Bolts, Machine Bolts, Carriage Bolts, Washers, Cotter Pins, and Nails. We are not limited to types of metals ferrous or non-ferrous. Most sizes can be accommodated.
3. Each package may carry your own message, printed on the bag. Up to three lines of copy may be used to describe the contents and promote the quality of your product. This feature also eliminates any chance of error in packaging of proper materials.

for information contact:

Mid-Continent Screw Products Company
5842 NORTH BROADWAY
CHICAGO 40, ILLINOIS

AFE-10-59

I am interested in your fasten-PAK packaging process.

- ☐ Please send me any available information or literature.
☐ Please have a representative call on me.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Use postpaid card. Circle No. 264

William J. Blatchford will be in charge of installations and service.

INSERT INSTALLING TOOL AT METALS SHOW

A new miniature automated inserting tool for high speed production installation of wire thread inserts will be demonstrated for the first time at the Metal Show in Chicago by the Heli-Coil Corporation, Danbury, Conn., at Booth No. 1559. Capable of driving up to 1200 inserts per hour, the new hopper feed and lightweight gun combination is designed specifically for automated assembly line operation in any type or size of material where higher loading strength and greater resistance to wear are required in tapped holes. Weighing only 18 ounces, the gun can be remotely operated up to 8 ft away from the hopper feed mechanism. The Show will be held Nov. 2-6.



ALL-STATE APPOINTS TWO DISTRIBUTORS

New distributors for All-State Welding Alloys Co., White Plains, N.Y., are Elyria Supplies Co., Elyria, Ohio, and The Balbach Company, Des Moines, Iowa.

AEROQUIP PLANS EXPANSION PROGRAM

Peter F. Hurst, president of Aeroquip Corporation, announced that a record \$2,400,000 capital expenditure program, providing a total of 140,000 square feet of working area, has been scheduled for the next 18 months. The six major pro-

jects included in this expansion program are: A new and larger plant for the Elbecco Division in Jackson, Mich.; an extension to the Jackson Division plant in Jackson, Mich.; a plant addition to the Industrial Division in Van Wert, Ohio; new production facilities at the Western Division in Burbank, Calif.; a new engineering center for the Marman Division in Los Angeles; a special laboratory for testing products used on rockets, missiles, and other advanced applications to be operated by the Engineering Center in Jackson.

HUCK ADDS HAGG AS ENGINEERING REP.

W. F. Hagg has been named engineering representative to work with E. G. Sallen in the southern half of metropolitan Los Angeles and the state of Arizona. His headquarters is Hawthorne, Calif.

Hagg's background includes seven years in aircraft industry engineering and quality control. Prior to joining Huck, he had been a quality control engineer in research with Convair-Astronautics, San Diego.



CLARK BROS. APPOINTS N.Y. SALESMAN

Clark Bros. Bolt Co., Milldale, Conn., has appointed Wendel J. Kraft to handle sales in New York state. A veteran of 21 years in the fastener industry, he will represent Clark on their complete line of fasteners.

AGENCY TO IMPORT GERMAN BOLT MACHINES

A new U.S. and Canada sales and service engineering organization, The Boltmaster Co., 5297 West 130th St., Cleveland 30, Ohio, has been formed to import the German-made bolt forming machines of Peltzer & Ehler. The new company is headed by Howard D. Prutton, industry design and service engineer.

FREE!

SAMPLE

ASSORTMENT



**cold headed
FASTENERS
and small parts**

Just to give you a real live, in your hand, sample of the tremendous possibilities in cold heading, we'd like to send you absolutely free a sample package of typical Hassall products.



Just check the inquiry card and your samples will be on their way.

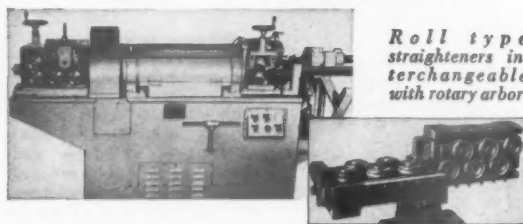
JOHN Hassall INC.

P. O. Box 2217
Westbury, Long Island, N. Y.

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If you use wire up to 3/8"

**... this new SHUSTER
is just for you!**



Roll type straighteners interchangeable with rotary arbor.

These new SHUSTER wire straightening and cutting machines incorporate new advantages to give you higher production — for less cost. The 2ABV variable speed unit straightens and cuts round wire from 3/16" to 3/8"; the 2ABVF straightens and cuts shape stock up to 1/4" square.

The new machines include an improved, vertical drive 5-roll gear driven preliminary straightening unit, and feed roll housing, both Timken bearing equipped. The new SHUSTERS can automatically cut lengths up to 14" at the rate of 140 pcs./min. and provide infinite variable speed within all feed and cutoff ranges. This machine may also be purchased as a constant speed unit (150 F.P.M.).

See It At The Metal Show—Booth 1712

METTLER MACHINE TOOL, INC.
151 W. Adeline New Haven, Conn.

Use postpaid card. Circle No. 266

Assembly and Fastener Engineering

SPEEDWAY MECHANICS WIN B&D VALVE SHOP

Participating for the fourth consecutive year in the 500-mile Indianapolis speedway classic, The Black & Decker Mfg. Company, Towson, Md., awarded a complete Electric Valve shop to both the winning mechanic and pole position mechanic in this year's event. Recipients of these gifts for 1959 were "A. J." Watson, whose No. 5 Leader Card Special carried Rodger Ward to victory; and Bob "Rocky" Phillip, whose Racing Association Special was driven by Johnny Thompson to win pole position for the race and hit a new one-lap track record of 146.532 m.p.h.

This is the second win for Watson, who received the first B&D Mechanic's Award when his Zink Special, driven by Pat Flaherty took the winner's flag in the '56 run.

The Valve Shop includes a B&D valve refacer with air chuck, a "Vibro-Centric" valve seat grinder, and a complete set of grinding stones.



Roger Ward (right), winner of the 1959 Indianapolis classic, admires the electric valve shop awarded his mechanic A. J. Watson by The Black & Decker Mfg. Co.

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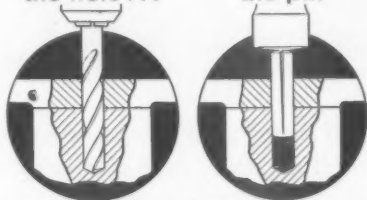
For Fast Assembly...

GILLEN GROOVE PINS

No Reaming

Drill the hole...

Insert the pin

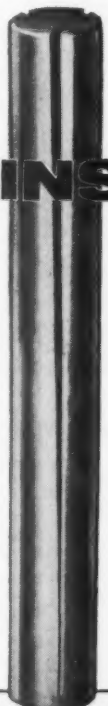


**Fast... Secure
Saves Time and Money**

3 grooves compress and reform to diameter of hole for tight positive fit... no tapping, no threading, no reaming.

Six types, for many applications, variety of lengths and diameters, all metals.

Write for information. Ask for samples.



JOHN GILLEN COMPANY

Keying and Pinning Devices

2558 South 50th Avenue • Cicero 30, Illinois

A Subsidiary of Standard Railway Equipment Manufacturing Company

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October, 1959

SPEED PRODUCTION and LOWER COST on your products

with this

GRIP-NUT

family of GRIPCO FASTENERS

All types and sizes of Gripco fasteners listed in catalogue are available for immediate delivery.

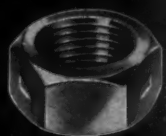
Qualified fastener engineers are available for consultation on all your assembly problems.

Other Gripco Products:

- BRASS GRIPCO OR CENTERLOCK NUTS.
- MINIATURE WELD AND CLINCH NUTS, WITH OR WITHOUT LOCK.
- GRIPCO AND CENTERLOCK HI NUTS.
- STANDARD SEMI-FINISH FULL AND JAM NUTS.
- STAINLESS STEEL LOCK, WELD AND SEMI-FINISH NUTS.
- COLD FORMED SPECIAL NUTS OR PARTS TO PRINT.



GRIPCO LOCK NUT
One piece all metal.



GRIPCO CENTERLOCK NUT
Locking feature in the center for fast feeding. Can be applied from either end.



GRIPCO CLINCH NUT

With or without Gripco Lock. For application to metal too thin to thread or for inaccessible assemblies. Hex collar prevents turning when torquing bolt.



GRIPCO PILOT-PROJECTION WELD NUT

With or without Gripco Lock. Centering collar positions nut and protects threads from weld spatter.



GRIPCO COUNTERSUNK WELD NUT

With or without Gripco Lock. Countersink protects threads from weld spatter.

The Nation's Oldest Manufacturer
of Lock Nuts

Send for samples and NEW CATALOG today

GRIP-NUT COMPANY

113 MAPLE AVE. ★ SOUTH WHITLEY, INDIANA

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SPS FILM PROBES DISTRIBUTOR ROLE

The vital but often misunderstood role of industrial distribution in the business economy is dramatized in a 20-minute color film produced by Standard Pressed Steel Co., Jenkintown, Pa.

Relying on a Mike Wallace-type interview technique for its lively format, the 16-mm movie covers all the principal ways in which the industrial distributor serves both industrial buyer and supplier alike.

"A Talk With Mr. D" has been endorsed and is being distributed by the National Industrial Distributors Association (NIDA), the Southern Industrial Distributors Association (SIDA) and the American Supply and Machinery Manufacturers Association (ASMMMA.)

Prints are also available on request from SPS for showing by any industrial distributor, by purchasing agents or by other interested industry or community groups.

PITTSBURGH SCREW NAMES NEW SALESMAN

John T. Pennington has been appointed sales representative in the Philadelphia area, it was announced by Pittsburgh Screw and Bolt Corporation. Mr. Pennington held a similar position with the Townsend Co. for five years prior to this appointment.

FORMER ESSO PRES. NEW NYLOK DIRECTOR

Stanley C. Hope has been elected to the board of directors of the Nylok Corporation, Paramus, N.J. Hope retired last year as president of the Esso Standard Oil Company, with which he spent his entire business career.

Hope is now president of the National Association of Manufacturers, and chairman of the Automotive Safety Foundation. He is also president of the Soundsciber Corporation.



Admiring the new Stanscrew catalog introduced at the recent general sales conference are, left to right, W. J. Cox, sales manager, western division; R. W. Grady, sales manager, Hartford division; E. L. Claussen, vice-president sales; H. T. Thompson, sales manager, Chicago division.

STANSCREW HOLDS FIRST SALES MEETING

Highlighted by speeches by both W. D. Corlett and J. A. Taylor, board chairman and president respectively, Standard Screw Company recently conducted the first general sales conference for its 25-man staff of fastener specialists.

Held at Standard Screw's Chicago division headquarters in Bellwood, Ill., this two-day meeting follows the company's coordination of all fastener marketing activities for its three fastener-producing divisions. In addition to Chicago, they are the Western division, Elyria, Ohio, and the Hartford division, Hartford, Conn.

FOX APPOINTED EUTECTIC SALES MANAGER

Robert F. Fox has been named national sales manager of Eutectic Welding Alloys Corporation. Fox has been with the company for 13 years, recently as regional manager for Metropolitan New York-New Jersey.

For torquing problems USE the

New "TITANTORKER" controlled TORQUE DRIVER

"TITANTORKER" makes controlled power torque available for a variety of torque uses—at low cost.

When desired torque is reached an audible signal is given as the internal driving balls are forced out of their sockets and overrun.

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"TITANTORKER" can be used with any motive power except impact wrenches. Is ideal for most controlled power torque problems due to ease of adjustment and maintenance.

Available in 4 sizes in maximum torques from 75" lb. to 225' lb., with Female Adapters in driving head and Male Adapters on torque base.

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Here are miniature set screws made to the accuracy and quality which have built Moore's reputation for dependability. Hardness, threads, and sizes are quality controlled to assure precision uniformity.

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Assembly and Fastener Engineering

CLEVELAND CAP ADDS REGIONAL SALES MGRS.

The Cleveland Cap Screw Co., Cleveland, has appointed two new regional sales managers. David G. Kelton will be sales manager, eastern states, and Lawrence J. O'Connor, Jr., sales manager, southeastern states.

Both men will supervise sales representatives and handle customer relations in their territories. Kelton has been with the company for 10 years and has been assistant general sales manager.



KELTON



O'CONNOR

GRIES REPRODUCER APPOINTS SALES AGENT

Howard H. Jungkind, Leonia, N.J., has just been appointed exclusive sales agent to handle Gries Reproducer Corp. industrial products and services for the storm door and window screen and jalousie trade and their jobber suppliers in New York and New Jersey.

WILLIAMS NAMES SALES VICE-PRESIDENT

Edward R. Burkhardt has been elected vice-president in charge of tool sales of J. H. Williams & Co., Buffalo manufacturer of wrenches, tools and drop-forgings, at a recent director's meeting of United-Greenfield Corporation of Chicago.

Burkhardt joined Williams in 1954 as Los Angeles sales representative. In 1955 he became sales manager of the company's tools division. Burkhardt succeeds John B. Perkins who retired on July 1 after 45 years with Williams.



continued

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DELRON FASCO INTERNAL THREAD
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Illustrated above are two of the many new Delron structural design fasteners now available for Honeycomb and Sandwich Panels.

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special machines	+	large stock of material	×	years of experience	=	speedy deliveries high quality low prices
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Here are a few samples made to customers specifications . . . Our batteries of special high-speed multi-spindle, automatic machines make possible fast and accurate production of hexagon nuts of non-standard height and special shape from carbon or alloy steel, Naval bronze or other non-ferrous metals; also AN 310 through AN 335 as per latest Airforce specifications. Very often the special nut you require may be similar to one we are already making and a simple modification would result in a price advantage and quicker deliveries to you . . . Send us your blueprint and particulars —let us quote on your requirements . . . We also have a catalog that contains complete specifications, engineering data and prices regarding our standard nuts.

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***12 Pointer, Square and Hexagon Nuts**
... "Huglock" and "Conelock" locknuts.

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HAMILTON ASSEMBLES MILLIONTH DRYER

Hamilton Manufacturing Co., Two Rivers, Wis., has produced its one millionth automatic clothes dryer, since 1938.

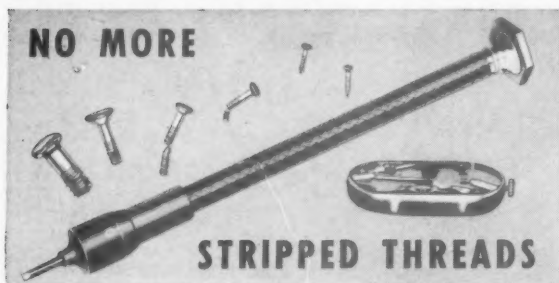
As a highlight of the factory observance, J. Ross Moore, inventor of the dryer, tightened the last nut and bolt on the one millionth dryer, a deluxe gas model. Another guest was Guenther Baumgart, president of the American Home Laundry Manufacturers Association, Chicago.

W. A. Friedrich, Hamilton vice president-sales, was moderator of the ceremony.

Hamilton manufactured its one millionth dryer nearly a month ahead of early production schedules, a company spokesman announced. Nationally, the dryer industry is running 31% ahead of last year.



Clothes dryer inventor J. Ross Moore fastens the last connection on the one millionth Hamilton automatic dryer at the company's Two Rivers, Wis. plant. Looking on is president E. P. Hamilton.



...OR BUCKLED AND BROKEN MOVEMENT PLATES
...RUINED PRECISION ASSEMBLIES AND FINDINGS

Apco Mossberg's New Tiny Torque Screwdriver lets you control those delicate tiny torques from 0 to 3 tenths of an inch-ounce, or from 0 to 6, 8, or 10 tenths of an inch-ounce!

A Precision Jeweler's-Type Screwdriver, Tiny Torque "fits the hand," enables even the inexperienced to tighten tiny screws without shearing threads, cramping gears, fragile parts.

Designed for #0 to #2-56 screws, and for #0 to #4 screws using interchangeable hardened screwdriver blades. Only 4 3/4" long. Easy-to-read white, etched graduations on barrel. Write for Details!



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The millionth dryer celebration was climaxed August 21, the opening night of the Wisconsin State Fair in Milwaukee, which had been designated as "Hamilton Night." J. Ross Moore and E. P. Hamilton were awarded a special commemorative plaque in recognition of the company's manufacturing milestone and its contribution to the state's economic well-being.

TOWNSEND SELLS NEW BRIGHTON PLANT

Sale of a major part of the New Brighton, Pa., plant of Townsend Co., which was vacated by transfer of many departments to its Engineered Fasteners Division's new factory in Ellwood City, Pa., was disclosed.

Acquisition of 14 buildings with 320,000 square feet of office and manufacturing space by the Marcus-Paulson Company of Fallston, Pa., was announced. Townsend's fastener division will continue to own and operate the wire mill and rod shed at New Brighton.

REPUBLIC NAMES NYLOK DISTRIBUTOR

The appointment of the Skelly Bolt Corp., Philadelphia, distributor for Nylok self-locking nuts in the Philadelphia area is announced by the Bolt and Nut Division of Republic Steel, Cleveland, Ohio.

MISSOURI FIRM TO HANDLE POP RIVETS

Kansas City Bolt Nut & Screw Co. will handle the complete Pop rivet and power riveting tool line of United Shoe Machinery Corp., Boston, announced John Folk, president of the Missouri firm.

RISDON PROMOTES MIDWEST SALES REP.

Andrew C. E. Peasco, midwest sales representative of The Risdon Company since 1947, has been appointed industrial sales manager, it was announced here by Lewis A. Dibble, president. His headquarters will be here in Naugatuck.

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FASTENERS for EVERY
FASTENING OPERATION
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ORIGINATORS
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Assembly and Fastener Engineering

HUCK ADDS TO MIDWEST SALES STAFF

James E. Auckley has been appointed engineering representative for Huck Mfg. Co., Detroit, with offices in Omaha, Nebraska. Auckley will serve customers in Kansas, Western Missouri, southern Nebraska and southwestern Iowa. A graduate of St. Louis University, Auckley brings to his new job a background of 13 years in sales work. Prior to joining Huck, he had been a sales engineer with a metal fabrication firm in the St. Louis area.



BUDD CO. ENGINEER DISCUSSES SPOT WELDS

A control system which will measure the temperature of spot welds and automatically feed back information was the subject of a paper presented by G. R. Archer, The Budd Company, at the national fall meeting of the American Welding Society, Oct. 1, in Detroit.

This control system is claimed to ensure good welds even in the face of insurmountable production problems. The control receives automatic information of the temperature of the spot weld and is thus able to make the required corrections. Variations in metal thickness, force, voltage variations and the like can all be taken into account with this new system.

Further information is available from the American Welding Society, 33 W. 39th St., New York 18, N.Y.

INDIANA CAP & SET SCREW MOVES PLANT

The new Indiana Cap & Set Screw plant covers over 35,000 sq. ft. and is located on six acres of land in Franklin Park, an industrial suburb of Chicago, announces president Howard Langdon.

Unusual features include a unique racking system which

continued

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Installs all Huck steel or aluminum fasteners from 1/8" through 3/8" diameter, (except CKL), in a continuous 1-1/4" stroke.

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Weight—5 lbs.
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ASME ANNUAL MEETING IN ATLANTIC CITY

The American Society of Mechanical Engineers will hold its annual meeting Nov. 29 through Dec. 4 in Chalfonte Had-don Hall in Atlantic City, N.J. The final society conference of the year will climax the year's 28 sponsored events. Also scheduled, for Nov. 16-20, is the Automation Show & Conference on Materials Handling in New York City.

R & A OPENS MIDWEST SALES OFFICE

The opening of a midwest area sales office at 3553 W. Peterson Ave., Chicago 45, Ill., has been announced by Rubber & Asbestos Corp., Bloomfield, N.J. Personnel at the new branch include Robert Zins, regional manager, and Stewart Marshall transferred from New Jersey.

VOI-SHAN REPORTS \$24 MILLION SALES

Voi-Shan Industries, Inc., formerly Pheoll Mfg. Co., reported sales of \$24 million for fiscal year ending June 30, 1959—an increase of \$1½ million over the previous year.

In the company's annual report released Sept. 16, Mason Phelps, president, also revealed the sale in April 1959 by Pheoll of its Industrial Fasteners Division and Impact Extrusion Department for approximately \$4,100,000 to a Chicago group now called Pheoll Mfg. Co., Inc. This transaction was accompanied by a change in company name to Voi-Shan Industries (VSI), encompassing the retained operations of Voi-Shan Mfg. Co., Voi-Shan Electronics and Tubing Seal Cap Company. Headquarters is now Los Angeles.



CENTENNIAL CELEBRATION—A mother's helping hand assists Kent Kenji Marugame of Lihue, Kauai, Hawaii accept five shares of stock in the 100-year-old Gardner-Denver Company. Arthur G. Kruse, representative in Honolulu, makes the presentation as part of the company's Centennial celebration. The child received the stock as the first baby born in the nation's newest state on May 15, the anniversary of the founding of Gardner-Denver.

SALES CHANGES AT LAMSON & SESSIONS

Personnel changes within the sales department of The Lamson & Sessions Co., of Cleveland have been announced by J. G. Rayburn, vice president—sales: Sterling P. Abbey, sales manager—Ohio Division; R. M. Casey, sales manager—Chicago division. T. William Kelly, sales manager—Eastern district; R. G. Patterson, Jr., sales manager—Central district; Ray Burns, distributor sales manager; Bruce Fabens, manager—Order Service section.

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Smooth and Knurled Types, Coarse, or Fine Thread. Sizes 0.80 and Up. Splined and Flat Head, Nylock and Socket Set Screws

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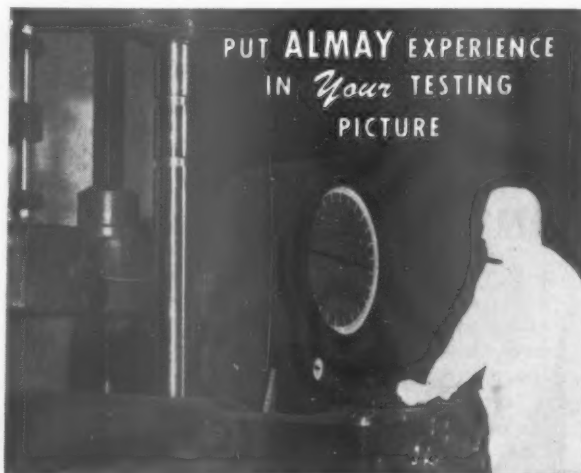
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Assembly and Fastener Engineering

Index to Products Advertised

Adhesives, 4
 Assembly machines, 18, 61, 87
 Assembly tools, 20, 27, 36, 38, 56, 70, 92, 93
 Bits, insert, 75
 Bolt installation tool, 93
 Bolt making machinery, 30-31
 Bolts
 Machine, 14, 52 A-F, 66, 82, 84, 86, 87, 94
 Locking, 22
 Press, 3
 Brazing preforms, 85
 Clamps, 66, 70, 78
 Clinching machinery, 21
 Clips, 13
 Cold heading machinery, 6, 30-31
 Cold heading, custom, 71
 Container, parts, 95
 Drilling machinery, 68, 4th C.
 Drill stop, 78
 Eyelets, 67
 Eyeletting machinery, 6
 Fasteners
 Aircraft, 8, 10, 12, 66, 85, 91, 95
 Blind, 22
 Cold-headed, 2d C., 57, 76, 88
 Corrosion-resistant, 28, 53, 66, 81, 84, 94
 Packaged, 14, 87
 Panel, 43, 91
 Quick-release, 10
 Special, 13, 24, 50, 57, 65, 82, 88, 91, 92, 93
 Feeders, parts, 23
 Flux, brazing, 85
 Grommets, 66, 67
 Holders, power bit, 75
 Hole preparation machinery, 23, 68, 4th C.
 Insert chasers, 80
 Inserts, self-tapping, 80
 Inserts, threaded, 16
 Inserts, wire thread 58
 Latches, 10, 43
 Nuts
 Cap, 95
 Clinch, 86, 89, 92
 Lock, 13, 39, 69, 85, 89, 91, 95
 Machine, 20, 91, 95
 Press, 3
 Special, 13, 60, 89, 91
 Turned, 91
 Weld, 50, 69, 86, 89, 92
 Wing, 78, 87, 95
 Parts, cold-headed, 17, 52 A-F, 54, 57, 89, 93
 Parts, hot forged, 28, 82
 Parts, stamped, 82
 Pins, cotter, 87
 Pins, dowel, 34
 Pins, locking, 53, 89
 Pliers, 39
 Plugs, 54
 Press, assembly, 18
 Retaining Rings, 5, 24
 Rivets, 62, 67
 Riveting machines, 21, 62, 77
 Rods, 82
 Rolling mill machinery, 6
 Screwdrivers, power, 20, 35, 61, 87
 Screws
 Cap, 17, 54, 94, 3d C.
 Drilled filler head, 12
 Machine, 54
 Miniature set, 72, 90
 Phillips, 29, 54, 75, 84
 Self-locking, 84
 Self-tapping, 14, 54, 65
 Sems, 2, 54, 76
 Set, 7, 17, 87, 94, 3d C.
 Special, 54
 Standard, 14, 52 A-F, 66, 76, 93
 Weld, 86
 Service, engineering & analysis, 2d C., 5, 6, 13, 17, 22, 27, 30-31, 35, 52 A-F, 56, 65, 71, 77, 85, 92, 94
 Tapping machinery, 23, 68, 4th C.
 Testing fasteners, 94
 Terminals, 76
 Tooling accessories, 75, 78
 Torque driver, 90
 Torque screwdriver, 92
 Torque wrench, 38, 70
 Washers
 Flat, 67, 79, 87, 94
 Lock, 59, 65, 76, 95
 Wire, cold-heading, 35
 Wire straightening machinery, 88
 Wrench, ratchet, 38

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Alden Containers, medium with tray chute in foreground, small with scoop chute in background.

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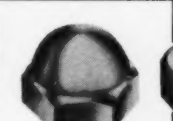

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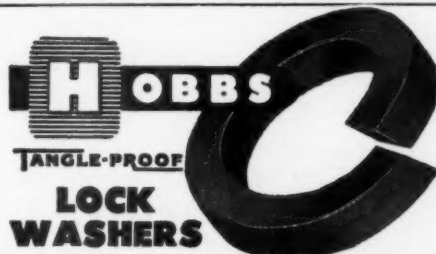
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"Isn't that cute? Junior's switching all those little nuts and bolts from bin to bin." • Adv. Republic Steel

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INDEX OF ARTICLES IN VOLUME ONE

(October, 1958, through September, 1959)

ADHESIVES, BONDING

- "Adhesive Bonds Paper to Metal Automatically," Nov. '58, p. 26
- "Plastic Foam Fastens, Bonds and Insulates New Lid," Dec. '58, p. 18
- "Convair Cuts Costs with Large-Scale Metal Bonding," Dec. '58, p. 21
- "Elastic Adhesive Solves Boat Leakage Problems," Dec. '58, p. 22
- "Quick-Setting Adhesive Bonds Dosimeter Pen Parts," Jan. '59, p. 16
- "Metal Bonding Salvages Scrap," Jan. '59, p. 19
- "Bonded Panels for Refrigerator Cabinets," Feb. '59, p. 19
- "150-Ton Bonding Press Produces Laminated Fiberglass Trimmers," Mar. '59, p. 19
- "Adhesive Sets in Minutes," Mar. '59, p. 20
- "Twin Coach Develops 'Ball Bonding' Process," Mar. '59, p. 21
- "Bonding of Helicopter Blades," Mar. '59, p. 22
- "Rubber-to-Metal Bond Simplifies Chuck Design," Apr. '59, p. 20
- "Power Tool Maker Uses Bonding," May '59, p. 19
- "Bonding Timing Gear Parts," Aug. '59, p. 21
- "Quick-Curing Bond Speeds Pen Assembly," Sept. '59, p. 19
- "Bonding, Riveting Aluminum Siding," Sept. '59, p. 41

AIRCRAFT

- "Solar Welds Metal Foil into Airframe Sections," Oct. '58, p. 30
- "Hardware Train' Saves Time, Money," Nov. '58, p. 17
- "Fasteners in the Space Age," Nov. '58, p. 36
- "Stainless Steel Fasteners," Nov. '58, p. 47
- "Convair Cuts Costs with Large-Scale Metal Bonding," Dec. '58, p. 21
- "Curtiss-Wright Develops Soldering Metal, Flux," Dec. '58, p. 24
- "Automatic Riveter Modified for Hot Dimpling," Jan. '59, p. 24
- "Convair Tape-Controls Spot Welding," Feb. '59, p. 17
- "Assembly Machine Sets Exact Torque Pneumatically," Mar. '59, p. 17
- "Bonding of Helicopter Blades," Mar. '59, p. 22
- "Building the DC-8 Jetliner," Sept. '59, p. 26

APPLIANCES

- "Tilt Station Facilitates TV Assembly," Oct. '58, p. 21
- "General Electric Cuts Hidden Costs in Dishwasher Assembly," Oct. '58, p. 27
- "Soldered Air-Conditioner Joints Tested by Vibration," Oct. '58, p. 28
- "Metal Stitching Speeds Assembly of Freezers," Oct. '58, p. 33
- "Set Screws Help Cut Appliance Maintenance," Oct. '58, p. 57
- "Automatic Welder Speeds Refrigerator Production," Nov. '58, p. 23
- "Plastic Foam Fastens, Bonds and Insulates New Lid," Dec. '58, p. 18
- "Nutrunner Assembles Compressors in 10-Second Cycles," Dec. '58, p. 21
- "Welding Assembly Tabs to Vinyl-Metal Laminates," Dec. '58, p. 36
- "Rotating Fixture Speeds Evaporator Coil Assembly," Jan. '59, p. 15
- "Telecontrol: New Management Tool at Oster," Feb. '59, p. 13
- "Assembly Machine Drills, Stakes Refrigerator Parts," Feb. '59, p. 17
- "Bonded Panels for Refrigerator Cabinets," Feb. '59, p. 19
- "Automatic Screw Driving Speeds Range Assembly," Feb. '59, p. 21
- "Special Hanger Bolt Halves Norge Part Costs," Feb. '59, p. 24
- "Solderless Terminals Aids RCA TV Assembly," Feb. '59, p. 24

- "Unusual Fastening Techniques for Air Conditioners," Apr. '59, p. 28
- "Air Tools Prepare Tubing for Brazing," Apr. '59, p. 37
- "Air Conditioner Line Automated with Standard Welders," May '59, p. 16
- "Progressive Line Changes Boost Welding Efficiency," May '59, p. 42
- "Engineering Skill Reaps Profit from Small Parts," June '59, p. 22
- "Spot Automation Speeds Assembly at Trade-Wind," June '59, p. 36
- "Fasteners Serve as TV Components," Aug. '59, p. 39

ASSEMBLING

- "Tilt Station Facilitates TV Assembly," Oct. '58, p. 21
- "Automatic Transfer in Starter Assembly," Oct. '58, p. 21
- "Conveyor Handles Parts Safely," Oct. '58, p. 22
- "G-E Cuts Hidden Costs in Dishwasher Assembly," Oct. '58, p. 27
- "Assemble 1200 Mops an Hour with Nutsetter," Oct. '58, p. 28
- see: "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 47
- "A Fail-Proof Assembly," Oct. '58, p. 54
- "Assembly Inspection by TV X-Ray," Oct. '58, p. 59
- "Give Assembly Instructions via Dictaphone," Nov. '58, p. 18
- "Self-Locking Inserts Ease Wrench Assembly," Nov. '58, p. 26
- "Meets Health Codes—Cuts Assembly Costs," Nov. '58, p. 28
- "Heat Program Timer Aids Welding of Small Assemblies," Dec. '58, p. 16
- "Welding Assembly Tabs to Vinyl-Metal Laminates," Dec. '58, p. 36
- "Rotating Fixture Speeds Assembly Work," Jan. '59, p. 15
- "Motorized Files Converted to Assembly Parts Baskets," Feb. '59, p. 18
- "Conveyors are Key to Efficient Assembly of Diesel Turbochargers," Feb. '59, p. 40
- "Assembly of Precision Electronic Products," Mar. '59, p. 30
- "Sliding Fixtures Aid Camera Assembly," Mar. '59, p. 35
- "How Clary Builds Reliability at Low Cost," April '59, p. 22
- "Fast Bearing Collar Assembly," April '59, p. 41
- "Computer Assembly Techniques," May '59, p. 37
- "Engineering Skill Reaps Profit from Small Parts," June '59, p. 23
- "Spot Automation Speeds Assembly at Trade-Wind," June '59, p. 36
- "Radar Cable Assembly," June '59, p. 49
- "TV Printed Circuit Boards Assembled Automatically," July '59, p. 20
- "Assembly of Electric Organs," July '59, p. 37
- "Dirt-Proof Joints for Food Carts," July '59, p. 43
- "Die Cast Parts Effect Assembly Savings," Aug. '59, p. 18
- "Muffle Noise, Boost Efficiency," Aug. '59, p. 24
- "Application of Weld Fasteners, part 2," Aug. '59, p. 33
- "Semi-Automated Assembly of Circuitry Board," Aug. '59, p. 42
- "Building the DC-8 Jetliner," Sept. '59, p. 26
- "Printed Circuits for TV: Efficient and Reliable," Sept. '59, p. 34
- "Assembling Manometers Faster," Sept. '59, p. 45
- "Assembly of Artillery Shell," Sept. '59, p. 49

ASSEMBLING & FASTENING OF PRODUCTS

- Chain Saws ("Sound Design Helps Check Harmful Vibrations"), Oct. '58, p. 44
- Spark Plugs ("Static Controls for Assembly Machines"), Oct. '58, p. 64
- Coffee Vending Machines ("Meets Health Codes—Cuts Assembly Costs"), Nov. '58, p. 28

Adding Machines ("Welding Precision Components"), Nov. '58, p. 33

Furniture ("From Bicycles to Furniture"), Nov. '58, p. 42

Bicycles ("From Bicycles to Furniture"), Nov. '58, p. 42

Compressors ("Nutrunner Assembles Compressor in 10-Second Cycles"), Dec. '58, p. 21

Toys ("Stitching Speeds Toy Production"), Dec. '58, p. 33

Aircraft ("Automatic Riveter Modified for Hot Dimpling"), Jan. '59, p. 24; ("Building the DC-8 Jetliner"), Sept. '59, p. 26

Auto Heater ("Auto Heater Tank Brazing"), Jan. '59, p. 28

Typewriters (Royal McBee Cuts Costs with Self-Tapping Screws"), Feb. '59, p. 26

Diesel Turbochargers ("Conveyors are Key to Efficient Assembly of Diesel Turbochargers"), Feb. '59, p. 40

Helicopter Blades ("Bonding of Helicopter Blades"), Mar. '59, p. 22

Electronic Aircraft Products ("Assembly of Precision Electronic Products"), Mar. '59, p. 30

Adding Machines ("How Clary Builds Reliability at Low Cost"), April '59, p. 22

Air Conditioners ("Unusual Fastening Techniques for Air Conditioners"), April '59, p. 28

Computers ("Computer Assembly Techniques"), May '59, p. 37

Toasters ("Engineering Skill Reaps Profit from Small Parts"), June '59, p. 22

Ventilation Equipment ("Spot Automation Speeds Assembly at Trade-Wind"), June '59, p. 36

Transmission ("Simplified Transmission Assembly"), June '59, p. 41

Radar Cable ("Radar Cable Assembly"), June '59, p. 49

Organs ("Assembly of Electric Organs"), July '59, p. 37

Food Carts ("Dirt-Proof Joints for Food Carts"), July '59, p. 43

Shells ("Assembly of Artillery Shells"), Sept. '59, p. 49

ASSEMBLY MACHINES

"Static Controls for Assembly Machines," Oct. '58, p. 64

"Assembly Machine Drills, Stakes Part," Feb. '59, p. 17

"Assembly Machine Sets Exact Torque," Mar. '59, p. 16

see: "Fast Bearing Collar Assembly," Apr. '59, p. 41

"Fabricator Licks Tough Forming, Assembly Job on the '59 Chevy," May '59, p. 11

"Pin-Installing Machine Boasts 8-Month Payback Period," June '59, p. 20

see: "Ford Simplifies Transmission Assembly," June '59, p. 41

"Efficient Pen Assembly Claimed for Machine," July '59, p. 21

"Semi-Automated Assembly of Circuitry Boards," Aug. '59, p. 43

"Printed Circuits for TV: Efficient and Reliable," Sept. '59, p. 34

"Assembly of Artillery Shells, Sept. '59, p. 49

AUTOMOTIVE

"Automatic Transfer in Starter Assembly," Oct. '58, p. 21

"Static Controls for Spark Plug Assembly Machines," Oct. '58, p. 64

"Install 4800 Rivets an Hour at Dorsey Trailers," Nov. '58, p. 75

"Chrysler Solves Deburring Problem," Dec. '58, p. 24

"Conveyors are Key to Assembly of Diesel Turbochargers," Feb. '59, p. 40

"Motorized Files Converted to Assembly Parts Baskets," Feb. '59, p. 18

"Holding Fixture Speeds Stud Setting," Mar. '59, p. 15

"Twin Coach Develops Ball-Bonding Process," Mar. '59, p. 22

"Fabricator Licks Tough Forming, Assembly Job on New Chevrolet," May '59, p. 11

"American Motors Varies Spot Welding Methods for Efficient Assembly," May '59, p. 19

"Auto Trim Attached by Projection Welded Fasteners," May '59, p. 20

"White Motor Rigidly Controls Bolting Operations," June '59, p. 19

"Simplified Transmission Assembly at Ford," June '59, p. 41

"Future Engineers Study Auto Assembly," June '59, p. 75

"300 HP Gas Turbine Engine Rivals Diesel in Economy," Aug. '59, p. 12

"Massey-Harris Cuts Costs by Resistance Welding," Sept. '59, p. 24

BOLTS

"Self-Locking Bolts Cut Maintenance on Presses," Oct. '58, p. 32

"RB & W Designs Strong, Close Tolerance Hex Unit," Dec. '58, p. 18

"Ore Tower Built with High-Strength Bolts," Feb. '59, p. 22

see: "How Tight is Tight?" Dec. '58, p. 40

see: "What is Proper Torque?" Feb. '59, p. 30

"Special Hanger Bolt Halves Norge Part Loss," Feb. '59, p. 24

see: "The Fastening of Light Metals," Mar. '59, p. 39

"Lockbolt Method of Fastening," Feb. '59, p. 45

see: "Tightening Threaded Fasteners," May '59, p. 24

"Bolts Secured by Vibration-Resistant Sealant," Apr. '59, p. 19

"White Motor Rigidly Controls Bolting Operations," June '59, p. 19

"Speed Bridge Erection by Using Bolts," July '59, p. 19

"Lockbolt Fastening Speeds Dome Erection," Aug. '59, p. 11

"Navy Adopts Lockbolts for Destroyer Repair Program," Sept. '59, p. 20

BRAZING

"High Temperature Brazing," Oct. '58, p. 49

"Brazing Cuts Engine Part Cost 45%," Dec. '58, p. 15

"Automatic Silver Brazing Speeds Production Line," Dec. '58, p. 22

"Curtiss-Wright Develops Soldering Metal, Flux," Dec. '58, p. 24

"Auto Heater Tank Brazing," Jan. '59, p. 28

"Brazing Method Cuts Honeycomb Costs," Mar. '59, p. 15

"Rotary Air Tools Prepare Tubing for Brazing," Apr. '59, p. 37

"Dip Brazing Reduces Assembly Failures," May '59, p. 15

see: "Dirt-Proof Joints for Food Carts," July '59, p. 43

"Automatic Facility Cuts Brazing Time by 90%," Aug. '59, p. 16

"Induction Heating Eases Brazing Job," Sept. '59, p. 19

BUSINESS

"Sales and Earnings," Oct. '58, p. 9—Nov. '58, p. 7—Dec. '58, p. 7

"1959 Forecast," Jan. '59, p. 7

"Education: U.S. vs. U.S.S.R.," Feb. '59, p. 7

"The Stock Market's Future," Mar. '59, p. 7

"Tax Depreciation Reform," Apr. '59, p. 7

"The Recession: Lessons to Learn," May '59, p. 7

"Inflation—Management's Move?" June '59, p. 7

"Let's Balance Our Budget," July '59, p. 7

"Business Sees 'Red' Overseas," part 1, Aug. '59, p. 7—part 2, Sept. '59, p. 11

CLAMPS

"Felt-Lined Clamps Reduce Soldering Heat Rejects," May '59, p. 17

"Clamps Cut Coil-Binding Time," July '59, p. 16

"Clamps Speed Manometer Assembly," Sept. '59, p. 45

CLIPS

"Copper-Nickel Alloy Clips Solve Corrosion Problem," June '59, p. 19

"Steel Clip Springs Back into Original Shape after Flattening, Flexing," Sept. '59, p. 23

COLOR CODING

"Coloring Process Codes Plastic Assembly Parts," Apr. '59, p. 17

"Fasteners for Color Matching or Coding," Aug. '59, p. 49

CONVEYORS

- "Conveyor Handles Parts Safely at any Angle," Oct. '58, p. 22
"Conveyors are Key to Efficient Assembly of Diesel Turbochargers," Feb. '59, p. 40
"Westinghouse Welding Conveyor Ideas Modernize Transformer Assembly," June '59, p. 11
"Productive Ideas in Conveyors," Aug. '59, p. 15

DESIGN

- "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 44
"Design and Application of Set Screws," Oct. '58, p. 70
"Let's Consider Rivet Applications," Jan. '59, p. 32
"Quarter-Turn Fasteners in Product Design," Apr. '59, p. 45
"The Design and Application of Retaining Rings," May '59, p. 30
"Engineering Skill Reaps Profit from Small Parts," June '59, p. 23
"Design and Application of Well Fasteners," part 1, July '59, p. 28—part 2, Aug. '59, p. 33
"Blind Rivets Permit One-Man Assembly," July '59, p. 49
"Let's Consider Applications of Solid Pins," Aug. '59, p. 28
"Versatility of Die-Cast Fasteners," Sept. '59, p. 55

EDUCATION

- "Fastener School One of Best in Industry," Aug. '59, p. 47

ELECTRONICS

- "Spin-Riveter Simplifies Terminal Board Assembly," Oct. '58, p. 27
"Printed Circuit Boards Assembled Automatically," July '59, p. 20
"Assembly of Electric Organs," July '59, p. 37
"Semi-Automated Assembly of Circuitry Board," Aug. '59, p. 43

FASTENERS

- "G-E Cuts Hidden Costs in Dishwasher Assembly," Oct. '58, p. 29
"The Design and Application of Set Screws," Oct. '58, p. 70
"Fasteners for the Space Age," Nov. '58, p. 36
"From Bicycles to Furniture," Nov. '58, p. 42
"Stainless Steel Fasteners," Nov. '58, p. 47
"RB & W Designs Strong, Close Tolerance Hex Unit," Dec. '58, p. 18
"End-Welded Studs Save in Steel Joint Fastening," Dec. '58, p. 19
"Standardization Aids Research & Production," Dec. '58, p. 26
"Tensile Area of Threads," Dec. '58, p. 46
"Pins Solve Reactor Fastening Problem," Jan. '59, p. 15
"New Design—Quick Release Panel Nut," Jan. '59, p. 17
"Screw-Lock Insert Aids Assembly," Jan. '59, p. 19
"Couplings Lock, Seal Separator Screens," Jan. '59, p. 21
"Let's Consider Rivet Applications," Jan. '59, p. 32
"Quick Servicing for Gasoline Pumps," Jan. '59, p. 36
"Hardened Plug Nuts Save Tapping," Jan. '59, p. 41
"Shock and Vibration Testing," Feb. '59, p. 34
"Lockbolt Method of Fastening," Feb. '59, p. 45
"The Fastening of Light Metals," Mar. '59, p. 39
"Unusual Fastening Techniques for Air Conditioners," Apr. '59, p. 28
"Quarter-Turn Fasteners in Product Design," Apr. '59, p. 45
"Auto Trim Attached by Projection Welded Fasteners," May '59, p. 20
"Tightening Threaded Fasteners," part 1, May '59, p. 24
"Engineering Skill Reaps Profit from Small Parts," June '59, p. 23
"Power Tools for Tightening Threaded Fasteners," part 2, June '59, p. 27
"New Fastening Technique Eliminates Deep Drawing," June '59, p. 44

- "How Good Are the Self-Tapping Screws You Buy?" July '59, p. 22
"The Design and Application of Weld Fasteners," part 1, July '59, p. 28
"New Fastening Method: Locking Flutes," Aug. '59, p. 15
"Fasteners Serve as TV Components," Aug. '59, p. 39
"Fasteners for Color Matching or Coding," Aug. '59, p. 49
"X-15 Rocket Re-Entry Flight to Impose Severe Test on Fastener Components," Sept. '59, p. 23
"Versatility with Die-Cast Fasteners," Sept. '59, p. 55

FASTENERS, projection welded

- "Auto Trim Attached by Projection Welded Fasteners," May '59, p. 20
"Design and Application of Weld Fasteners," part 1, July '59, p. 28—part 2, Aug. '59, p. 33

FEEDERS (Nuts, parts, etc.)

- "Air Vibrator Feeder Regulates Locknut Flow," Dec. '58, p. 25

FIXTURES

- "Rotating Fixture Speeds Assembly Work," Jan. '59, p. 15
"Holding Fixture Speeds Stud Setting," Mar. '59, p. 15
"Sliding Fixtures Aid Camera Assembly," Mar. '59, p. 35
"Clamping Tools Shorten Setup Time," May '59, p. 15
"Felt Lined Clamps Reduce Soldering Heat Rejects," May '59, p. 17
"Turning Vibrating Device Improves C-V Quality Control," May '59, p. 22
"Clamps Cut Coil Binding Time," July '59, p. 16

HARNESS WIRING

- see: "Assembly Instructions by Dictaphone," Nov. '58, p. 18
"Hughes Automates Computer Wiring," Dec. '58, p. 15
see: "Solderless Terminal Joining," Feb. '59, p. 24
see: "Computer Assembly Techniques," May '59, p. 37
"Radar Cable Assembly," June '59, p. 49
see: "Assembly of Electric Organs," July '59, p. 37
"Testing Car Wiring Harness," Sept. '59, p. 25

HEADING, hot

- see: "Welding Precision Components," Nov. '58, p. 33

HONEYCOMB

- see: "High Temperature Brazing," Oct. '58, p. 49
"Brazing Method Cuts Honeycomb Costs," Mar. '59, p. 15

INSERTS

- "Self-Locking Inserts Ease Wrench Assembly," Nov. '58, p. 26
"Screw-Lock Insert Aid Assembly," Jan. '59, p. 19
see: "Simplified Transmission Assembly," June '59, p. 41
"Threaded Wire Inserts Resist Vibration, Strengthen Slide Feeder Arrangement," July '59, p. 19

MATHEMATICS

- see: "The Missiles-Age Hurls a Challenge: Product Reliability," Oct. '58, p. 36

MISSILES

- "Recoverable Supersonic Target Missile Cheers Taxpayers," Oct. '58, p. 13
"New Missile Parts Plant," Oct. '58, p. 13
"Instant Acceleration to 18 G's on Missile Test Rails," Oct. '58, p. 14
"The Missiles-Age Hurls a Challenge: Product Reliability," Oct. '58, p. 36
"Fasteners in the Space Age," Nov. '58, p. 36
"Missile Tail Sections Built by Casting, Bolting," Jan. '59, p. 22
"150-Ton Bonding Press Produces Laminated Fiberglass Trimmers," Mar. '59, p. 19
"X-15 Rocket Re-Entry Flight to Impose Severe Test on Fastener Components," Sept. '59, p. 23

NUTS

- "Nuts for Jet Engines Operating up to 1400 F," Oct. '58, p. 22
"A Fail-Proof Assembly," Oct. '58, p. 54
"RB&W Designs Strong, Close Tolerance Hex Unit," Dec. '58, p. 18
"New Design—Quick Release Panel Nut," Jan. '59, p. 17
"Hardened Plug Nuts Save Tapping," Jan. '59, p. 41
see: "Tightening Threaded Fasteners," May '59, p. 24

PINS

- "Pins Solve Reactor Fastening Problem," Jan. '59, p. 15
"Pin-Installing Machine Boasts 8-Month Payback Period," June '59, p. 20
"Let's Consider Applications of Solid Pins," Aug. '59, p. 28

PLASTICS

- "Coloring Process Codes Plastic Assembly Parts," Apr. '59, p. 17
"American Plastics Makes Long-Wearing Nylon Hinge," Apr. '59, p. 21
"New Uses for Burr-Like Nylon Fastener," June '59, p. 15
"Tests Reveal Acetal Resin Pipe Plugs Seal to 1350 PSI," June '59, p. 20
"Liquid Polymer Solves Sealing Problems at Norgren," Aug. '59, p. 22

POWER TOOLS

- "Assemble 1200 Mops An Hour," Oct. '58, p. 28
"Nutrunner Assembles Compressor in 10-Second Cycles," Dec. '58, p. 21
"Automatic Screw Driving Speeds Range Assembly," Feb. '59, p. 21
"Solderless Terminal Joining Aids TV Assembly," Feb. '59, p. 24
"Lockbolt Method of Fastening," Feb. '59, p. 45
"Rotary Air Tools Prepare Tubing for Brazing," Apr. '59, p. 37
"Power Tool Maker Uses Bonding," May '59, p. 19
"Power Tools for Tightening Threaded Fasteners," part 2, June '59, p. 27
"Muffle Noise, Boost Efficiency," Aug. '59, p. 24
"Air Tool Attachment Developed to Trim Blind Rivets," Sept. '59, p. 20
see: "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 44
see: "Meets Health Code—Cuts Assembly Costs," Nov. '58, p. 28
see: "From Bicycles to Furniture," Nov. '58, p. 42
see: "How Tight is Tight?" Dec. '58, p. 40
see: "Royal McBee Cuts Costs with Self-Tapping Screws," Feb. '59, p. 27
see: "What is Proper Torque?" Feb. '59, p. 30
see: "Unusual Fastening Techniques for Air Conditioners," Apr. '59, p. 28

PRINTED CIRCUITS

- "Felt-Lined Clamps Reduce Soldering Heat Rejects," May '59, p. 17
"TV Printed Circuit Boards Assembled Automatically," July '59, p. 20
"Semi-Automated Assembly of Circuitry Board," Aug. '59, p. 43
"Printed Circuits for TV: Efficient and Reliable," Sept. '59, p. 34

RELIABILITY

- "The Missiles-Age Hurls a Challenge: Product Reliability," Oct. '58, p. 36
"Assembly Inspection by TV X-Ray," Oct. '58, p. 59
"How Clary Builds Reliability at Low Cost," Apr. '59, p. 21
"Dip Brazing Reduces Assembly Failures," May '59, p. 15
"Felt Lined Clamps Reduce Soldering Heat Rejects," May '59, p. 17
"Turning Vibrating Device Improves Quality Control," May '59, p. 22
"How About Ultrasonic Weld Inspection," Aug. '59, p. 19

RINGS

- "The Design and Application of Retaining Rings," May '59, p. 30
"Chance Vought Develops New Hydraulic O-Ring Seal," July '59, p. 16

RIVETING

- "Card or Tape-Controlled," Oct. '58, p. 16
"Spin-Riveter Simplifies Terminal Board Assembly," Oct. '58, p. 27
"Rubber Rivets Seal Holes," Nov. '58, p. 14
"Jet Wing, Body Skins Flush Riveted," Jan. '59, p. 20
"Automatic Riveter Modified for Hot Dimpling," Jan. '59, p. 24
"Let's Consider Rivet Applications," Jan. '59, p. 32
"Blind Rivets Permit One-Man Assembly," July '59, p. 49
"Air Tool Attachment Developed to Trim Blind Rivets," Sept. '59, p. 20
"Bonding, Riveting Aluminum Siding," Sept. '59, p. 41
see: "Upset Tool Speeds Riveting," July '59, p. 47

SCREWS

- "The Design and Application of Set Screws," Oct. '58, p. 70
"Royal McBee Cuts Costs with Self-Tapping Screws," Feb. '59, p. 25
"How Good Are The Self-Tapping Screws You Buy?" July '59, p. 22
see: "Fast Bearing Collar Assembly," Apr. '59, p. 41

SEALANTS and SEALING

- "Liquid Sealant Locks Pipe Plugs," Nov. '58, p. 24
"Roller Bearings Locked with Liquid Sealant," Jan. '59, p. 23
"Bolts Secured by Vibration-Resistant Sealant," Apr. '59, p. 19
"Liquid Polymer Solves Sealing Problem," Aug. '59, p. 22
"Latches Seal DC-8's Turbo-Compressor Cabin," Sept. '59, p. 25

SOLDERING

- "Soldered Joints Tested by Vibration," Oct. '58, p. 28
"Selective Plating Allows Soldering Without Flux," Nov. '58, p. 20
"Tin-Zinc Solder Joins Aluminum to Copper," Feb. '59, p. 23
"G-E Speeds Motor Armature Soldering," Apr. '59, p. 15
"Silver Soldering Solves Tricky Conduit Joining Problem," Apr. '59, p. 19
"Felt Lined Clamps Reduce Soldering Heat Rejects," May '59, p. 17
"Automatic Soldering Quadruples Output," July '59, p. 15
see: "Auto Heater Tank Brazing," Jan. '59, p. 28

STANDARDS

- "Standardization Aids Research and Production," Dec. '58, p. 26

STICK WAX

- see: "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 46

STITCHING, metal

- "Metal Stitching Speeds Assembly of Freezers," Oct. '58, p. 33
"Stitching Speeds Toy Production," Dec. '58, p. 33
"Ring Forming Stitcher Cuts Costs 50%," Feb. '59, p. 22
"Metal Fabricator Finds Stitching Five Times Faster," June '59, p. 16

STUDS

- see: "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 46
"Holding Fixture Speeds Stud Setting," Mar. '59, p. 15
see: "The Fastening of Light Metals," Mar. '59, p. 39
"Carbide Tapped Holes Speed Stud Installation," Aug. '59, p. 21

TELEVISION

- "Tilt Station Facilitates TV Assembly," Oct. '58, p. 20
- "Assembly Inspection by TV X-Ray," Oct. '58, p. 59
- "TV Printed Circuit Boards Assembled Automatically," July '59, p. 20
- "Solderless Terminal Joining Aids TV Assembly at RCA," Feb. '59, p. 24
- "Fasteners Serve as TV Components," Aug. '59, p. 39
- "Printed Circuits for TV: Efficient and Reliable," Sept. '59, p. 34

THREADS

- "Tensile Area of Threads," Dec. '58, p. 46

TORQUE

- "How Tight Is Tight?" '59, p. 40
- "What Is Proper Torque?" Feb. '59, p. 30
- "Assembly Machine Sets Exact Torque," Mar. '59, p. 16
- "How to Determine Torque-Tension Relationships," Mar. '59, p. 26
- "Tightening Threaded Fasteners," part 1, May '59, p. 24
- "Power Tools for Tightening Threaded Fasteners," part 2, June '59, p. 27

TRADE SHOWS

- 1959 Design Engineering Show, May '59, p. 46

VIBRATION

- "Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 44
- "Shock and Vibration Testing," Feb. '59, p. 34
- "Threaded Wire Inserts Resist Vibration, Strengthen Slide Feeder Assembly," July '59, p. 19

WELDING

- "Solar Welds Metal Foil Into Airframe Sections," Oct. '58, p. 30
- "Investigate Seam Welding," Nov. '58, p. 14
- "Magnetic Tape Tracer Aids Arc Welding," Nov. '58, p. 17
- "New Reactor Cuts Cost," '58, p. 19
- "Ultrasonic Spotwelds all Metals, No Fusion," Nov. '58 p. 21
- "Automatic Spotwelder Speeds Refrigerator Production," Nov. '85, p. 23
- "Welding Precision Components," Nov. '58, p. 33
- "Heat Program Timer Aids Welding of Small Assemblies," Dec. '58, p. 16
- "Welding Assembly Tabs to Vinyl-Metal Laminates," Dec. '58, p. 36
- "Ultrasonic Seam Welder Welds Dissimilar Parts," Jan. '59, p. 16
- "Convair Tape-Controls Spot Welding," Feb. '59, p. 17
- "Production-Line Welding for Large Bridge Girders," Mar. '59, p. 19
- "Sigma Welding Cuts Reaction Coil Costs," Apr. '59, p. 15
- "Electron Beam Welder Joins Reactive, Exotic Metals," Apr. '59, p. 16
- "Air Conditioner Line Automated with Standard Welders," May '59, p. 16
- "American Motors Varies Spot Welding Methods," May '59, p. 19
- "Auto-Trim Attached by Projection Welded Fasteners," May '59, p. 20
- "Progressive Line Changes Boost Welding Efficiency," May '59, p. 42
- "Westinghouse Welding, Conveyor Ideas Modernize Transformer Assembly," June '59, p. 11
- "The Design and Application of Weld Fasteners," part 1, July '59, p. 27

- "How About Ultrasonic Weld Inspection?" Aug. '59, p. 19
- "25,000 Inert-Gas Spot Welds Used in Tank Fabrication," Aug. '59, p. 22
- "Electron Beam Units Weld Super Alloys," Aug. '59, p. 23
- "The Design and Application of Weld Fasteners," part 2, Aug. '59, p. 33
- "G-E Welds Relay to Cut Contact Contamination," Sept. '59, p. 21
- "Farm Tool Fabricator Cuts Costs by Resistance Welding," Sept. '59, p. 24

EDITORIALS

- "An Opportunity to Soar Your Imagination," Oct. '58, p. 5
- "There's More Falling Than Autumn Leaves," Nov. '58, p. 5
- "Standardization—A Challenge to Ingenuity," Dec. '58, p. 5
- "The Responsibility of Sharing Know-How," Jan. '59, p. 5
- "A Missing Link in Product Design?" Feb. '59, p. 5
- "The Payoff of Lifetime Reliability," Mar. '59, p. 5
- "Low Engineer Enrollment Again, Why?" Apr. '59, p. 5
- "Automotive Progress Is Wonderful, but . . ." May '59, p. 5
- "Assembly Work for the Handicapped," June '59, p. 5
- "Abetting The Forces of Inflation," July '59, p. 5
- "Don't Compromise With Quality Control," Aug. '59, p. 5
- "Have You Considered a Fastener School?" Sept. '59, p. 7

ONE LAST WORD

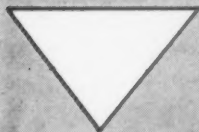
- "The Meeting Will Come to Order," Oct. '58, p. 104
- "The Pleading Maiden in Outer Space," Nov. '58, p. 80
- "Trim the Fat, Save the Muscle," Dec. '58, p. 80
- "Who, If Not You? When, If Not Now?" Jan. '59, p. 64
- "It's More Than A New Year, It's A New Age," Feb. '59, p. 80
- "The Strychnine and Potassium Cyanide of Business," Mar. '59, p. 72
- "When Is A Fastener Not A Fastener?" Apr. '59, p. 84
- "Your Mortal Enemies, The Detractors," May '59, p. 74
- "Automate Or Die," June '59, p. 88
- "Knowledge and the Inevitability of Specialized Responsibility," July '59, p. 72
- "Specialized Responsibility Requires Specialized Reading," Aug. '59, p. 82
- "Poor Quality: Whose Fault?" Sept. '59, p. 98

AUTHORS

- Anderson, Kenneth E.
Vice Pres. & Gen. Mgr. Norge Div., Borg-Warner Corp.
"Rotary Tools Prepare Tubing for Brazing," Apr. '59, p. 37
- Battles, Ralph S.
Pres., Judson L. Thomson Mfg. Co.
"Let's Consider Rivet Applications," Jan. '59, p. 32
- Booth, Hal
Facilities Engineer, Long Beach Div., Douglas Aircraft Co.
"Automatic Riveter Modified For Hot Dimpling," Jan. '59, p. 24
- Braendel, F. W.
Pres., Groov-Pin Corp.
"Let's Consider Applications of Solid Pins," Aug. '59, p. 28
- Brimmyer, H. G.
Vice Pres. of Research, Huck Mfg. Co.
"Blind Rivets Permit One-Man Assembly," July '59, p. 49
- Burns, Arthur G., Dr.
Pres., National Bureau of Economic Research
"The Recession: Lessons to Learn," May '59, p. 7
- Buschmeyer, William
Product Planner, McClintock Mfg. Co.
"Dirt-Proof Joints for Food Carts," July '59, p. 43
- Butler, W. Jack
Aramco Public Relations, Arabian American Oil Co.
"Business Sees 'Red' Overseas!" Part I, Aug '59, p. 7
"Business Sees 'Red' Overseas!" Part II, Sept. '59, p. 11

- Chase, Carl
Industrial Engineer, Gries Reproduser Corp.
"Versatility With Die-Cast Fasteners," Sept. '59, p. 55
- Crespy, Paul
Prod. Superintendent, Heater Div., Blackstone Corp.
"Auto Heater Tank Brazing," Jan. '59, p. 28
- Davey, John S.
Vice Pres., Research & Eng., Russell, Burdsall & Ward
Bolt and Nut Co.
"How To Determine Torque-Tension Relationships," Mar. '59, p. 26
- Dodge, X. Raymond
Vice Pres., Set Screw & Mfg. Co.
"The Design & Application Of Set Screws," Oct. '58, p. 70
- Engstrand, William D.
Western Editor
"Conveyors Are Key To Efficient Assembly of Diesel Turbochargers," Feb. '59, p. 40
"Computer Assembly Techniques," May '59, p. 37
"Spot Automation Speeds Assembly at Trade-Wind," June '59, p. 36
- Finelli, Daniel
Mechanical Engineer, Naval Ordnance Laboratory
"Shock and Vibration Testing," Feb. '59, p. 34
- Hallowell, H. Thomas, Jr.
Pres., Standard Pressed Steel Co.
"The Missiles-Age Hurls A Challenge at Us . . . Product Reliability," Oct. '58, p. 36
- Hanneman, W. M.
Executive Eng., Shakeproof Div., Illinois Tool Works
"How Tight Is Tight?" Dec. '58, p. 40
- Hazard, Leland
Board of Directors, Pittsburgh Plate Glass Co.
"Inflation—Management's Move," June '59, p. 7
- Heuertz, Matt E.
Managing Editor
"Sound Design Helps Check Harmful Vibrations," Oct. '58, p. 44
"Welding Assembly Tabs to Vinyl-Metal Laminates," Dec. '58, p. 36
"New Fastening Technique Eliminates Deep Drawing," June '59, p. 44
- Knohl, F. K.
Chief Field Eng., Shakeproof Div., Illinois Tool Works
"Fasteners for Color Matching or Coding," Aug. '59, p. 49
- Kolbert, Oswald, Dr.
Technical Mgr., Truarc Retaining Rings Div., Waldes Kohinoor, Inc.
"The Design and Application of Retaining Rings," May '59, p. 30
- Long, William E.
Engineer, Lamson & Sessions Co.
"Hardened Plug Nuts Save Tapping," Jan. '59, p. 41
- Lovisek, Louis
Mfg. Mgr., Parker-Kalon Div., General American Transportation Corp.
"How Good Are the Self-Tapping Screws You Buy," July '59, p. 22
- Maher, Lawrence A.
Factory Manager, Westfield Mfg. Co.
"From Bicycles to Furniture," Nov. '58, p. 42
- McCarthy, Fred
General Foreman, Cable Dept., Raytheon Mfg. Co.
"Radar Cable Assembly," June '59, p. 49
- McFee, W. E.
Supv. Prod. Information Service, Armco Steel Corp.
"Stainless Steel Fasteners," Nov. '58, p. 47
- Mitnik, W. P.
Mgr., Prod. Eng. Dept., Gilbert & Barker Mfg. Co.
"Quick Servicing for Gasoline Pumps," Jan. '59, p. 37
- Newcomer, J. R.
Chief Engineer, Camloc Fastener Corp.
"Quarter-Turn Fasteners in Products Design," April '59, p. 45
- Olds, Frank V.
Assistant Comptroller, Chrysler Corp.
"Wanted: Tax Depreciation Reform!" April '59, p. 7
- Pierce, Merrill Lynch
Fenner & Smith
"The Stock Market's Future," Mar. '59, p. 7
- Rosan, Jose, Sr.
President, Rosan, Inc.
"Fasteners in the Space Age," Nov. '58, p. 36
- Salrin, R. E.
Chief Prod. Eng., LearCal Div., Lear, Inc.
"Assembly of Precision Electronic Products," Mar. '59, p. 30
- Savaglio, Fred
Plant Mgr., Drayer-Hanson Div., National-U.S. Radiator Corp.
"Unusual Fastening Techniques for Air Conditioners," April '59, p. 28
- Schlarman, H.
Mech. Eng.
"Tensile Area of Threads," Dec. '58, p. 46
- Schmidt, Emerson P., Dr.
Director, Economic Research, Chamber of Commerce of the U.S.
"1959 Forecast: Recovery, Yes; Boom, No," Jan. '59, p. 7
- Setapen, A. M.
Mgr. of Eng., Handy & Harman
"High Temperature Brazing," Oct. '58, p. 49
- Skoog, Donald K.
Director of Research, Thor Power Tool Co.
"What Is Proper Torque?" Feb. '59, p. 30
- Smith, Ray H.
Associate Editor
"Assembly Inspection by TV X-Ray," Oct. '58, p. 59
"The Design & Application of Weld Fasteners," July '59, p. 28
"Application of Weld Fasteners," Aug. '59, p. 33
"Assembly of Artillery Shell," Sept. '59, p. 49
- Sparks, Frank H., Dr.
President, Council for Financial Aid to Education
"Education Front: U.S. Industry vs. U.S.S.R.," Feb. '59, p. 7
- Sturges, Edward B., II
President, Lock Thread Corp.
"The Fastening of Light Metals," Mar. '59, p. 39
- Teller, Henry J.
Supervisor of Assembly Standards, Royal McBee Corp.
"Royal McBee Cuts Costs with Self-Tapping Screws," Feb. '59, p. 26
- Van Sittert, Paul
Chief Development Eng., The Rotor Tool Co.
"Tightening Threaded Fasteners," May '59, p. 24
"Power Tools for Tightening Threaded Fasteners," June '59, p. 27
- Voss, D. H.
Gen. Superintendent, DC-8 Facility, Douglas Aircraft Co.
"Building the DC-8 Jetliner," Sept. '59, p. 26
- Ward, Darrell
Engineering Editor
"A Fail-Proof Assembly," Oct. '58, p. 54
"Static Controls for Assembly Machines," Oct. '58, p. 64
"Meets Health Codes—Cuts Assembly Costs," Nov. '58, p. 28
"Standardization Aids Research and Production," Dec. '58, p. 26
"What Is Proper Torque?" Feb. '59, p. 30
"Bonding of Helicopter Blades," Mar. '59, p. 22
"How Clary Builds Reliability at Low Cost," April '59, p. 22
"Progressive Line Changes Boost Welding Efficiency," May '59, p. 42
"Engineering Skill Reaps Profit from Small Parts," June '59, p. 22
"The Assembly of Electric Organs," July '59, p. 37
"Muffle Noise, Boost Efficiency," Aug. '59, p. 24
"Printed Circuits for TV: Efficient & Reliable," Sept. '59, p. 34
- Wyckoff, W. R.
Mgr. Technical Services, The Townsend Co.
"The Lockbolt Method of Fastening," Feb. '59, p. 45

CONTENTS IN THIS ISSUE



Don't overlook these articles

FEATURES

32—New Assembly Method for Rocker Arms

Better valve rocker arms for the Rambler are made at lower cost.

37—Automatic Nut and Stud Welding

One man runs three automated in-line welders at Whirlpool.

40—Bonding Honeycomb Desk Tops

All-metal finds paper honeycomb produces much stronger desk tops.

44—The Douglas Fastener School

Employee-students must "graduate" before doing certain assembly work.

48—Popular Articles in Volume One

Reader survey of best-liked articles in first 12 issues.

51—Use of Snap-Torque Wrenches

Applications of factory pre-set and adjustable torque wrenches.

IDEAS AND REPORTS

19—Sliding Trays Aid Piston Assembly

English firm achieves 40% increase in production with simple jigs.

20—Brazing Slashes Rotor Costs

When redesigned to use furnace brazing, costs were cut 80%.

25—Diecastings Connect Terminal Boards

Use of tiny diecast cams overcomes production bottleneck of new process.

25—Zinc Soldering of Aluminum Parts

Alcoa engineers adapt old process to bonding thin complex sections.

26—New Automotive Transfer Machine

Thirty-station machine is rated at 436 auto parts per hour.

28—Bonding Miniaturized Parts

Adhesive permits conveyor-assembly of small phonograph cartridges.

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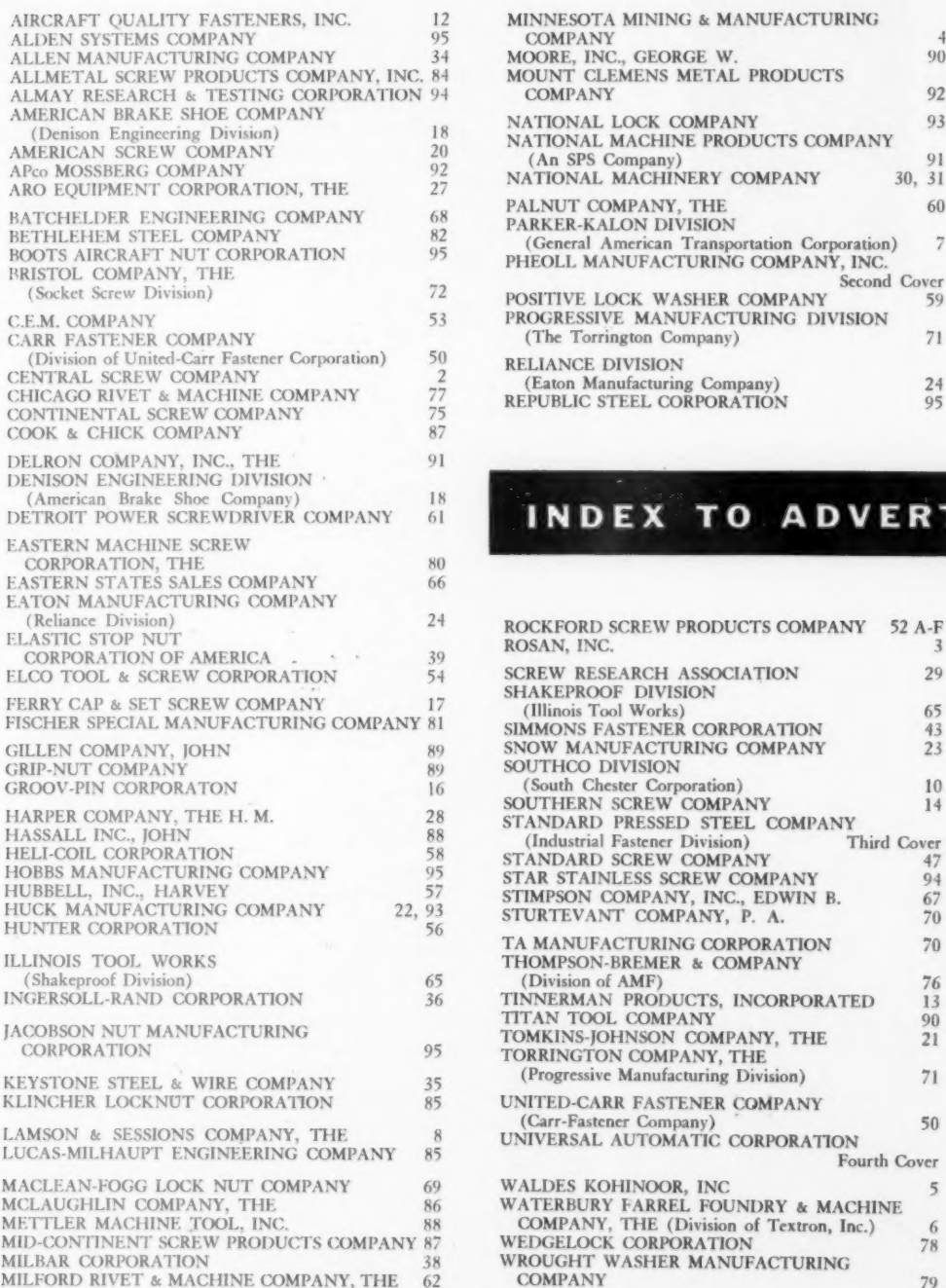
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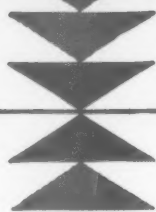
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ONE LAST WORD

IS HUMAN ENGINEERING PUPPETEERING?



We don't like the word Human Engineering. It smacks of puppeteering. Pull the right string and the workers will dance. The trick is to know which string to pull and when. And so we need a science which will predict, by scientific methods, when to pull the string and how to make sure it's the right one.

The implication in Human Engineering is that we should find a slide rule, foolproof method of getting workers to work harder, complain less, and be satisfied with their lot and pay. This is always the goal of Human Engineering—how to get more for less. It is always directed downward at the workers. For, after all, they are at fault that there is not more profit, that there is labor unrest, and low productivity. The problem is, then, how to engineer the workers into a frame of mind so that all discord is eliminated and sunshine spreads its warmth from the bottom up to the top. The approach is unsound! It is doomed to failure because it is based on the wrong premise. It is based on how, through manipulations, to get more, without giving more.

We are always looking for an easy answer, one which will not entail undue work or a changed attitude. In other words, how can the company remain exactly as it is with its calcified thinking, its set pattern and pet habits, and still promote more worker loyalty, greater cooperation, and reap the benefits to be gathered from an improved, beneficial worker attitude? What single material thing can the company do? A picnic?

Paid insurance? Coffee breaks? More leisure for workers? Company magazines? Good working conditions?

No! These are only a portion of the answer. At best, they are incomplete because they deal with material instead of spiritual values, and because they look down to the worker, instead of up to management. Basic company attitudes must change. Workers must not be thought of as units of cost, but as human values. Let us change merely one phrase and we will appreciate how much can be accomplished in the realm of human behavior. Let management say: How can I work more harmoniously with my colleagues? What can I give my colleagues in terms of professional job satisfaction? How can I share with my colleagues the sense of importance of what we're all trying to do together?

Note two important changes in thought: First, workers are not employees, or units, they are colleagues; second, what can I give, and not, what can I get; third, how can I share. When looked at from this point of view we must ask, is a picnic the answer? A longer coffee break? Paid life insurance? Any other material palliative? They sound pretty flimsy when confronted by such stirring thoughts as, Professional Job Satisfaction, Work Harmony, Sense of Importance. My Colleagues! Whether we like it or not, the lowliest sweeper is a colleague of the chairman of the board whether the former, or the latter, likes it or not!

Wm. J. Schleicher

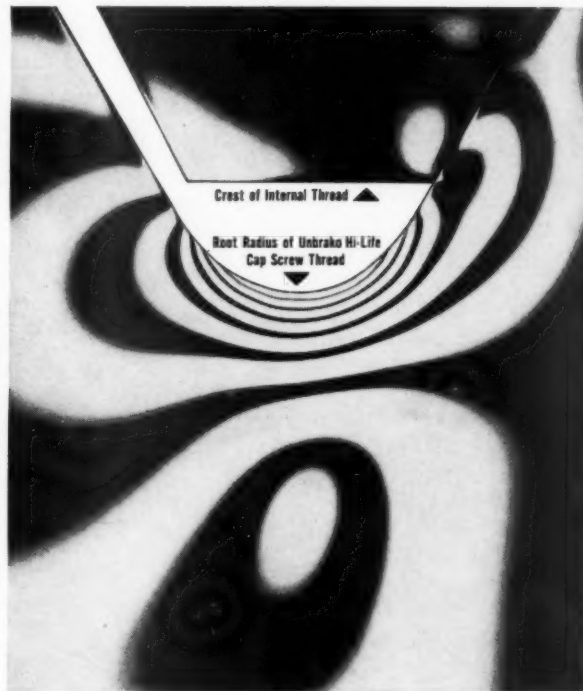
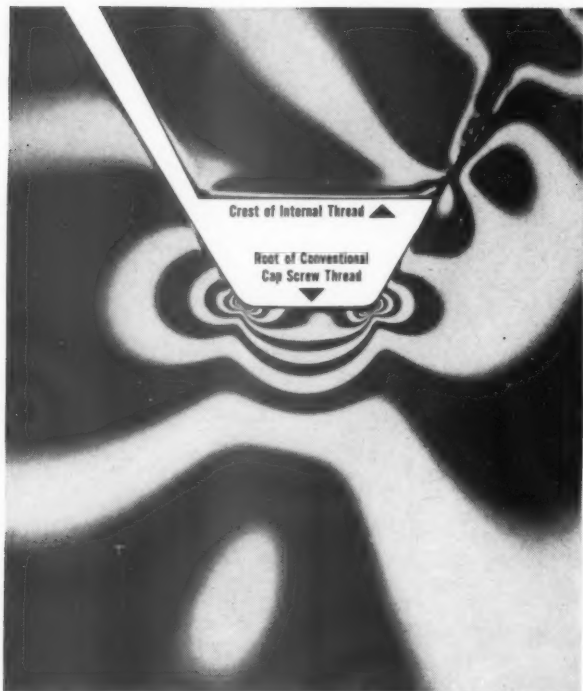
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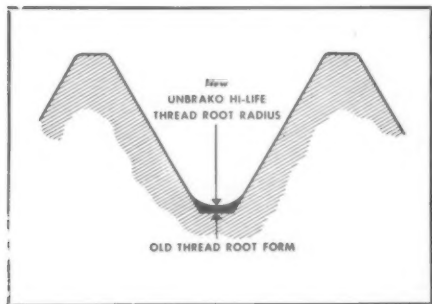
COMPARE THESE PHOTOELASTIC STUDIES

OLD THREAD ROOT FORM has sharp corners which cause high stress concentration and reduce fastener fatigue life.

NEW UNBRAKO HI-LIFE THREAD ROOT has large, smooth radius which distributes stresses, thereby increasing fastener fatigue life.

At no increase in cost,
new UNBRAKO Hi-Life socket
head cap screws offer

- Up to 100% greater fatigue life
- Increased tensile strength capacity
- Additional life insurance for your product



COMPARE THE THREAD ROOT FORMS in the drawing at left. The bottom line indicates the old thread root form. Note the flat roots with sharp corners where cracks start. The top line indicates the new thread root form of UNBRAKO Hi-Life socket cap screws. Note the smooth, flowing curve that dissipates stresses. In addition to increasing fastener fatigue life up to 100%, the larger body cross section provides greater tensile strength, permitting the application of greater preloads.

And there is no waiting for the bonuses you get from new UNBRAKO Hi-Life socket cap screws. SPS distributors are now stocking these new precision fasteners with the improved thread root form, evolved through research on high-strength fasteners. Fatigue life of improved UNBRAKOS can increase the reliability of your product.

For more information, ask your nearest authorized SPS industrial distributor for a copy of Bulletin 2577. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium.



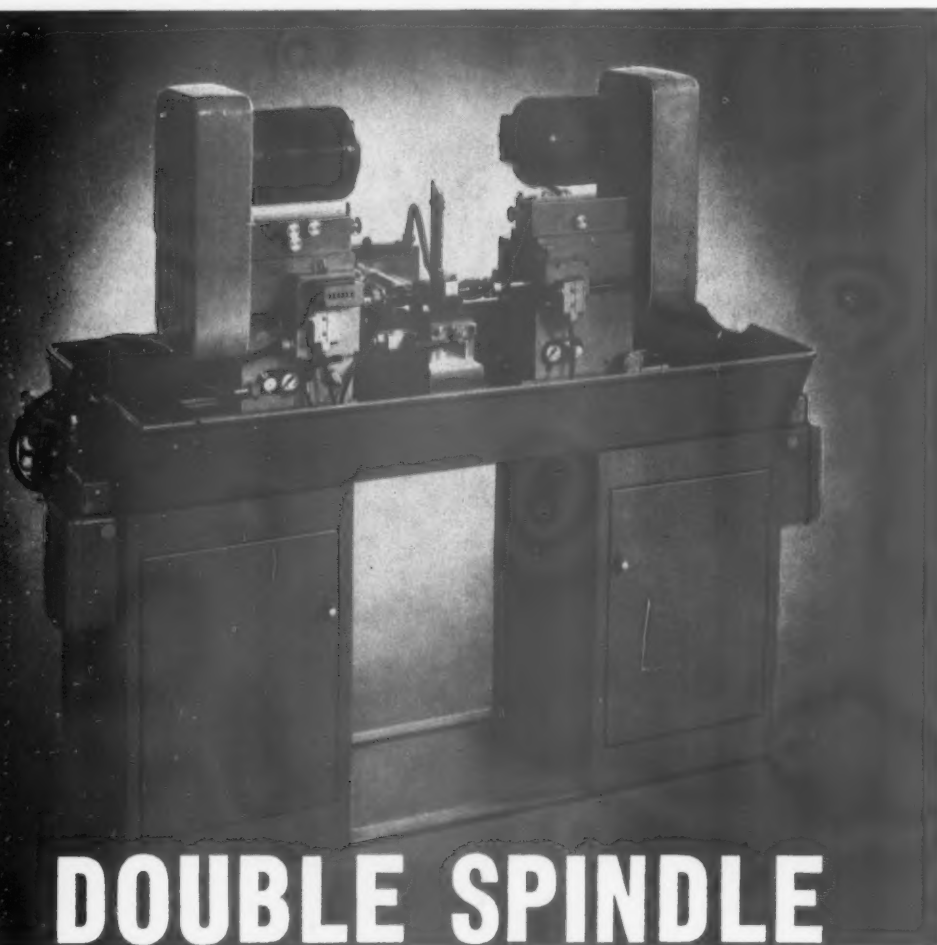
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